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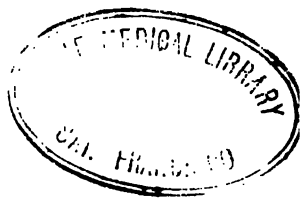
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PREFACE.

THE author must sue for some indulgence for the ensuing pages, on the plea, that many of them were written before epidemic cholera had actually invaded any part of England, and before its attack had been distinctly foreboded ; a portion of the manuscript has, indeed, been sacrificed, because the time, then contemplated as future, had already verged into the past. Ill health, combined with other unavoidable circumstances, had rendered an earlier publication impossible ; still it is hoped, that nothing has been retained but what may prove interesting and valuable, under the present circumstances, when all are dreading and expecting an invasion of Asiatic cholera.

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The author is aware, that, in treating of this malady, he is somewhat overstepping those limits, which custom has prescribed to surgical practice; but he feels, that any experience, sufficient to form a groundwork for deduction, should not now be hidden; and he therefore conceives, that if there be cause for blame, it should be attributed, not to him, but rather to the unavoidable circumstances, which threw in his way much painful experience of, and much opportunity for studying, this fearful disease.

During the worst part of the late epidemic, namely, from July to September, 1849, he was engaged, on account of the illness of Mr. Whitfield, the Resident Medical Officer at St. Thomas's Hospital, in superintending the admission of cholera patients into that institution, and, also, under the superintendence of the physicians, in the treatment of the sufferers. The whole neighbourhood of Southwark, with the parish of Bermondsey, suffered more from cholera than any other part of London, and St. Thomas's Hospital was the only institution, on that side

of the water, which received such patients; the number of applications was, therefore, during those months, enormous; none but the worst cases could, as a rule, be admitted, and as the wards were often fully occupied, the dying, almost the dead, were necessarily turned from the gate.

The author had, previously to his accepting, as *locum tenens*, the above-mentioned office, diligently attended the Cholera wards, and taken notes of most cases admitted; but when officially employed, he was still more desirous of gaining accurate knowledge of the disease, and still more assiduous in recording all, that came under his notice; these pages, therefore, are the result of his observations, and, in many instances, little more than transcripts of remarks, then made, and of conclusions he was then obliged to form.

It is to be regretted, that post-mortem examinations were not more frequently instituted at St. Thomas's Hospital, but many circumstances combined to prevent this practice; the author has, therefore, taken the liberty to annex

a translation of part of a paper by Drs. Reinhardt and Leubuscher, in which a masterly account is given of all morbid appearances, general and microscopic, found after death from cholera ; indeed, so minutely and circumstantially are all such details recorded, that, it is believed, they can scarcely fail to be of interest, both to the pathological inquirer and to the practical physician.

22, MADDON STREET ;

October 12th, 1853.

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ERRATA.

Page 46, line 8, and page 47, line 14, *instead of* "Conf. Aromat., ʒss,"
read "Conf. Aromat., ʒss."

„ 77, line 20, *for* "Hydr. Chlorid. statim," *read* "Hydrarg. Chlorid.,
gr. v, statim."

„ 211, line 13, *instead of* "succeeds in individuals in the," &c., *read*
"succeeds in individuals the," &c.

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ON
ASIATIC CHOLERA.

CHAPTER I.

THE SHADOW OF A COMING EVENT.

CHOLERA, or Asiatic Cholera, is a disease of epidemic character, which has always originated in the East, and spread gradually to the West. Its course between the year 1845, its second epidemic appearance in India, and the year 1848, its second epidemic appearance in England, is as well known as is the course of our India mails, and the dates of its arrival at certain towns, its modes and rates of travel, are all as well ascertained.

The statistics of its late visit to England are minute and circumstantial, and prove beyond all doubt, that the disease spreads by virtue of true epidemic, or atmospheric quality, and that contagion has little or nothing to do with it. Thus the disease seems to have broken out in Sunderland, Hull, and London, in each town, within a day or two of its attack in the other; a circumstance which can hardly be considered

possible, if the disease were propagated by contagious principle; but if it spread by epidemic power, it would be, considering the geographical position of Hamburg and Denmark, the very mode of attack most to be expected. Again, it broke out in London, not by gradually spreading from one, or even two centres; but by an attack on two or three almost simultaneously; then other places having no discoverable communications either with the first centres, or with each other, were invaded, and one outbreak, that on board the Convict-ship, or *Justitia* hulks, was shown beyond doubt to have arisen without any possibility of communication with any infected place whatever, as Mr. Grainger thus reports:—"A convict was seized in the *Justitia* hulk, at Woolwich, on the 2d of October; but the convicts at Woolwich, though they work in the dock-yard, are watched by armed soldiers, and are allowed no intercourse whatever with other persons, while the *Justitia* herself lies about three miles below Greenwich, far apart from any other vessel, except the Convict Hospital-ship, no merchant-vessel anchoring at this point of the river; so that if cholera had been raging at Woolwich, and had been prevailing in the vessels in the Thames, above Woolwich, the origin of cholera in the *Justitia* would not

have been attributable to contagion. But there was no cholera in Woolwich, nor in the merchant-vessels in the Thames; and the only cases in London, which were anterior in point of time to this, were those at Horsleydown, seven or eight miles distant, and in Fleet-street, ten or twelve miles distant. The occurrence of contact or proximity between these individuals, and the convict at Woolwich, may therefore be said to be absolutely impossible."

"So, again, in the *Dreadnought* Hospital-ship, a man was attacked on the 5th of October. The *Dreadnought*, as has been just stated, lies off Greenwich, three or four miles distant from the *Justitia*, with which it holds no kind of communication; it is also many miles distant from Horsleydown, Lambeth, Chelsea, and Fleet-street. This man had been on board the Hospital-ship, under treatment for another complaint, a month before his seizure; he could not, therefore, have been in contact, or proximity with any of the nine cases, which occurred previous to his attack; and no sailor arriving from any infected place had been admitted with any complaint whatever for some considerable time. 'By permission of the officers,' says Dr. Parkes, 'I took the opportunity of inspecting the admission book, and learned that no sailor ar-

riving in a ship from any port, in or near which, cholera was or had been prevalent, had been admitted with any complaint whatever, for some considerable time.' The disease, therefore, could not have been brought on board by the clothes of some non-infected individual, arriving from an infected ship."

Thus the conclusion is inevitable, that the poison, whatever it may be, is in the atmosphere, *i. e.* epidemic;* or that it depends, as some suppose, upon an obscure change in the

* A curious fact with regard to the absolutely non-contagious qualities of cholera deserves to be mentioned. The ward, in which the cholera patients were received, is at the bottom of a staircase, at the top of which is Abraham's Ward, and there are two intervening wards; George, the lower, Isaac the upper, of these two. Now of all the wards in the hospital Abraham's was that in which most patients were attacked with cholera or choleraic diarrhœa, while in Isaac's were much fewer, and in George's none. This created some surprise, and after inquiry it was thus explained. The mattresses in St. Thomas's are stuffed with flock, and each is emptied, when a patient occupying it has died, and the room in which the material was kept was then next to Abraham's Ward. Now it was found that the patients in Abraham's, who were allowed to leave the ward, were in the habit of lying down upon this flock before it had been properly purified, only a few ascended a flight of stairs from Isaacs, and fewer still, probably none, from George's. It was vain to remonstrate with the patients, and point out the folly of this proceeding; it was still continued. After a time, the room was kept locked, and then Abraham's was as free from cholera as any other. This fact does not go far to prove that this disease may, under certain circumstances, be slightly contagious; but it should hardly be quite overlooked.

usual electric and magnetic balance of earth and air, (which latter theory to be received requires more proof.)

Now, the disease attacked in preference, and most violently, those parts of town, where the lowest sanitary conditions existed, and was elsewhere hardly felt; it returned, says the report, in 1848, to the same courts and filthy alleys, to the same houses, aye, in many instances, to the same rooms, as in 1832; wherever fever was sporadic and most fatal, wherever scarlatina was malignant, and where small-pox assumed its worst forms, there did cholera show itself in its most deadly shape: thus in the parish of Bermondsey, the proportion of deaths to the number of inhabitants was 278 to 10,000, while in the Hanover-square district of the St. George's, Hanover-square, parish, 3 to 10,000 was the proportion; while in Jacob's Island, a horrible and filthy den of loathsomeness, disease, and crime, no less than 61 deaths occurred among 300 inhabitants, more, namely, than one fifth of the whole population, making the proportion 2033 : 10,000. The ratio between the deaths in these parts of town is 3, 278, 2033—showing that the choleraic influence, whatever it may be, is comparatively harmless in this climate at least, unless mixed

with, and aided by, certain local malarious poisons, which are very much or entirely under our control.

The neighbourhood of St. George's, Hanover Square, lies high and distant from the large open sewer, the Thames; it is well drained, is not over crowded, has several squares, broad streets, &c., and the cholera destroyed but 3 inhabitants in 10,000. Jacob's Island lies low on the banks of the Thames, is surrounded by a tidal ditch, containing most filthy mud and water, is not at all drained, is overcrowded, and the houses closely packed; in fact, the most pernicious combination of poverty and filth is here to be found, and cholera killed one fifth of the inhabitants. Thus, however powerful and virulent the cholera-poison may be, it really seems, that the constant local evils are necessary for its development and action,* and that, where these social cesspools do not exist, there the disease is powerless; as German mystic tales make the hero unassailable by the fiend, until some fault of the man has given power to the demon.

During the spring and summer of 1848, neuralgias and intermittent fevers were extremely common; influenza was violent, and attacked a very large proportion of London's

inhabitants; typhus fever was carrying off many of the poorer and more badly lodged classes; smallpox and scarlatina had been more fatal and more malignant, and diarrhœa was alarmingly rife. There is something extraordinary and well worthy of deep consideration in these facts; the deaths from typhus fever had increased in five years from 1·696 to 3·569; from diarrhœa the deaths had mounted from 393 to 1,913, in ten years, from 1838 viz. to 1848; during these years, too, both smallpox and scarlatina were similarly on the increase. The following table from the Registrar General's return for the quarter, July, August, September, of the years 1845, 1846, 1847, and 1848, shows the steady manner, in which mortality from these diseases had been gradually increasing.

	1845	1846	1847	1848
Zymotic diseases	2437	3255	4102	5162
Smallpox	76	51	320	435
Scarlatina	194	208	316	1566
Typhus	273	403	895	882
Diarrhœa	449	1549	1196	1048

The number of deaths from these causes is an index of the amount of epidemic force

in the atmosphere; their gradual, steady, and constant increase, shows a portentous augmentation of that force. When it is added that fever and influenza preceded the cholera in Russia, an increase of scarlet and intermittent fever in Hamburg, intermittent fever and diarrhœa in Berlin, and when we consider that the favorite lurking places of these diseases are the chosen haunts of cholera, it would be difficult not to see some close connection between the one class, and that which has been too much regarded as a disease *per se*.

It appears, then, that cholera—or rather that influence which produces cholera—travels from East to West; that alone it cannot produce the disease, but that it must also be aided and abetted by some local conditions, which, on their part alone, would produce diarrhœa, typhus, or intermittent fever, as the case may be; but whether epidemic cholera be caused by the operation of a mixture of these two influences, or whether the cholera influence produce that malady by operating on a system, well prepared for the attack, by a typhus-fever-producing condition, cannot now be judged. Nor is it of great importance; the material point being, that we can estimate the amount of epidemic force in any part of

England, by studying the returns of deaths in those parts, from zymotic diseases; that when these gradually go on increasing for a number of years, and when all disease more and more incline towards a low, malignant character, then may we suppose that a time is approaching, when some great epidemic shall scourge the land. When we find, moreover, as in London, that all diseases have, in about the last twenty years, altered considerably in character, and deviated from the previous sthenic, to a debile asthenic type, so that the treatment of many such has lately become stimulant, instead of antiphlogistic,—then may we justly conclude, that something in our sanitary arrangements is grievously wrong, for which, sooner or later, the population must suffer.

Such, then, was the condition of things in the years previous to 1848, when the last outbreak of cholera occurred. What are they now? Have zymotic diseases been increasing or decreasing? The Registrar-General's return for the last quarter, ending, namely, in June, gives this result, on comparison with the same quarters of the four preceding years: that smallpox is less destructive than in any previous year; scarlatina, though highly destructive, is less so than in 1852; whooping-cough is more fatal

than in any previous year; the whole sum of all deaths from these diseases is less fatal than in any of the three preceding years. But the deaths from typhus have been increasing, and this year have taken a wide step, from 483 to 678; diarrhœa decreased till the present year, and then rose with a spring; the mortality from influenza is low, that from intermittent fever has immaterially increased; but these latter diseases may be rife without causing many deaths.

The following Table is taken from the Registrar-General's Return for the quarter ending June, 1853:

	1850	1851	1852	1853
Typhus	426	428	483	678
Diarrhœa	200	191	163	292
Dysentery	25	34	35	42
Cholera	9	3	8	9
	660	656	689	1021

Thus it will be seen that since 1850, the year after the great cholera invasion, the number of deaths from typhus in that quarter gradually increased till 1853, when a sudden rise was made to half as many again, as in the previous year; diarrhœa was in the same years

gradually decreasing, as though the influence which produced that disease, as well as cholera, were going off, but in 1853 it rose to half as many again as in the previous year. These are significant facts, which no prudent people, having care of communities, should lose sight of; for they bespeak and prophesy most certainly the return of cholera. Moreover, the deaths from cholera itself have in the last three years increased, during that quarter; but not enough of itself to make us fear another approaching invasion of the disease, had not the number of deaths in the week ending August 6th increased to 4, in that ending August 13th to 19, while those from diarrhœa in the same weeks amounted to 110 and 113. When, besides taking these circumstances into consideration, we furthermore reflect, that epidemic cholera has not left Europe, scarcely even England, since its last outbreak in 1848 and 1849,—that the disease has been sporadic since then, in most large European towns,—that of late it has invaded with epidemic violence Copenhagen, Berlin, parts of Norway, Sweden, and Russia, where an attack immediately preceded, in 1848, the outbreak of the disease in England,—we cannot avoid coming to the unwelcome conclusion, that very shortly

another cholera epidemic will rage in London and other English towns.*

It is to be feared, that we are not better prepared for such an event, than in 1848, except by the increased experience gained of the disease. The Thames still continues a foul navigable sort of open sewer; the houses of the poor are not better drained; their water supply is scarcely more ample. From the knowledge acquired of this malady in 1848-9, it appears certain that foul air, bad water, &c., is necessary, or nearly so, to the development of cholera, and that the disease does not spread by contagion to those living in pure air, having good water, food, &c. Thus it seems almost entirely confined to the poorer classes, and hence is the difficulty in dealing with it; both funds, intelligence, and co-operation are wanting. But this is one of those cases, where charity from the wealthy is to be expected, not in mere alms-giving, when there is sickness, and, in the next few hours, more alms for the funeral, but given in such a mode, and in such quantity, as to prevent such sickness, and to preserve from death rather than to bury the dead.

* This chapter was written in the beginning of August, so that what now looks like a truism was then a prophecy too easily foretold.

If the poor, and the poor only, suffer from such a scourge, the more noble will be the pious charity in freeing them from it, as much as possible; the more ignoble the careless selfishness which may cause the well-to-do to wrap up himself in his security, and leave the helpless to wrestle hopelessly with those horrors that must prove a death-warrant to many of his kith and kin. Let, now, every one see what he individually may do, in aid of his poor fellow-creatures; let him not yield them passively to the filth and wretchedness, which is nearly sure to bring on disease of every form, visited upon the children, and upon the children's children; unless it come in a quick consuming shape to hurry thousands at one swoop into the grave.

The year is now pretty far advanced, and the time, when English cholera or crapulous diarrhœa is at its height, will soon be past; but we must not, therefore, suppose, that for this year the danger of cholera is over. In 1848 the first undoubted case of cholera occurred in London on the 22d of September, though probably one or two isolated cases were somewhat earlier; and from that date to the 10th October, a period of eighteen days, only 28 cases occurred. In this year of 1853, 19 cases have already occurred, and have been reported in

one week, showing that the poison is even now more actively at work, than during the month of September in the year 1848. In the English outbreak of the disease in 1832-33, there were two separate epidemic periods, a complete break and interval of eight months separating one from the other. The first attack lasted from February to November, 1832; after the latter date came the interval of eight months, in which only a few isolated cases occurred: then followed the second outbreak, which was very short, but so virulent, that in the five weeks of its continuance, it attacked nearly a third as many, as in the whole ten months of the preceding part of the pestilence. The epidemic of 1848 commenced in September, and continued increasing till January, 1849; then decreased again, so that an interregnum took place in March, April, and May—only a few cases occurring in those months. In June, the second part of the epidemic broke out, which, like that of 1833, was much more violent than the first. During the month of September, 1849, more than seven times the number of people died of this disease, than in any month of the preceding outbreak. In one week of that fatal month, more than twice the number fell victims to the disease, than during the

whole five months of the preceding part of the epidemic. This tendency to a double attack is most remarkable, and very worthy of attention, when we desire to calculate the probability of a visitation, during this and the ensuing year, and therefore, though our weekly returns are yet small, viz.:

July 16th	.	.	.	.	3
„ 23d	.	.	.	.	6
„ 30th	.	.	.	.	9
August 6th	.	.	.	.	4

yet can we be by no means certain, that even this is not the insidious approach of an enemy, who will, presently, visit us in a more fearful shape; that even this slight increase on our usual amount of deaths from cholera is not the commencement of an epidemic, the latter part of which may bring the most frightful and alarming mortality. It is certain, that there is a decided choleraic influence at work, even now in London, as shown by the steady augmentation of deaths from diarrhoea in the last few weeks, the returns for which run thus :

July 16th	.	.	.	.	54
„ 23d	.	.	.	.	73
„ 30th	.	.	.	.	81
August 6th	.	.	.	.	110*

* Since the above has been written the Registrar General's

while the deaths from typhus have also frightfully increased, supplying every ground to fear that a fresh attack of *cholera* is near and imminent.

Alarm, as is well known, has a powerful influence in promoting attacks of any disease, and therefore none would wish to excite terror; but as preventive means often check the insidious advances of cholera, the public should know the first signs of its attack, and should be instructed to recognise danger when it first appears; while the profession should be prepared with skill and means to turn every moment of the time still allotted to his patient's advantage.

returns show a still more alarming increase of choleraic epidemic force, as exhibited in the increase of both diarrhœa and cholera. The continuation of the above tables runs thus:

	<i>Cholera.</i>	<i>Diarrhœa.</i>
August 13th . . .	19 . . .	139
„ 20th . . .	10 . . .	126
„ 27th . . .	18 . . .	137
September 3d . . .	16 . . .	152
„ 10th . . .	7 . . .	184
„ 17th . . .	16 . . .	131

In fact, since writing the above, the events spoken of as probable have actually occurred.

CHAPTER III.

PREMONITORY, OR CHOLERAIC DIARRHŒA.

IN the tables given in the preceding chapter, and in all statistic records of the disease, in various countries, and of different epidemics, it will be observed that the outbreak is always preceded by diarrhœa, which goes on increasing, not only in the number attacked, but also in the violence of the cases ; nay, as the epidemic draws nearer and nearer, certain isolated cases occur, which assume more and more a choleroïd character, and which are returned, according to the view taken by the medical attendant, either as cholera or as diarrhœa, so that it was, in 1848, and will be again at any future time, extremely difficult, if at all possible, to fix and determine the exact date and time, when the first case occurs in any large town.

But, what is perhaps more remarkable, it is extremely difficult or impossible to fix a period, when Asiatic cholera first began in any one

individual, be he ever so carefully watched. Developed cholera and simple diarrhœa are two as distinct diseases, as can be well imagined, and yet do they so run into one another that it is impossible to give any one symptom, which could truly serve as the mark of distinction between the two; where the attendant could say, here did diarrhœa cease, and here cholera began. In bad cases of diarrhœa, as every practical man knows, there are not unfrequently cramps and coldness of the extremities; after many stools the motions begin to be less coloured with bile, and there is a considerable sinking of the pulse: therefore do these symptoms scarcely warrant us in calling such a case cholera. On the other hand, cases of cholera have come under my observation, in which the evacuations never quite lost the bilious tinge, and some have occurred, where there is neither purging nor vomiting; thus the occurrence of rice-water purging is no distinctive mark of the disease.

A case of well-developed algide cholera could, nevertheless, hardly be mistaken by the merest tyro, who had seen the disease before, for any other malady; but cholera seldom, at least in our country, reaches that stage, without having passed through a previous one of chole-

raic diarrhœa, which glides gradually into true algide cholera; and it is upon this premonitory diarrhœa, that I wish more particularly to insist, since it is perhaps the most important fact, with regard to the nature and management of the disease, which our late experience therewith has discovered. This form of diarrhœa, the true choleraic, is very painless, so much so, that those afflicted with it take less notice of the disorder, than people with purging usually do; it creeps on insidiously, guarded by a strange apathy of the patient, so constant as almost to seem a part of the disease, till at last the algide symptoms are induced.

Now, as this premonitory diarrhœa is in general very amenable to treatment, but if left alone leads surely to advanced cholera, it is most desirable that the importance, during such an epidemic, of attending immediately to any disturbance of the bowels, be sufficiently estimated, both by the public and the profession. To discover the comparative number of cases of advanced cholera, which had been preceded by premonitory symptoms, and of those which had not, I carefully collated every case of cholera, marking down the number of days, during which there had been diarrhœa, or other symptoms. It soon proved, however, to be per-

fectly impossible to get at the truth, with regard to the less well-marked symptoms, such as malaise, cold extremities, &c., which sometimes precede cholera; for women, when asked if they have not felt poorly lately, scarcely ever deny it, while men, in the absence of physical signs of illness, almost invariably answer, that "there warn't anything particular the matter with them that they know of." Thus I quite gave up the idea of including such slight disturbances, among the forewarning symptoms, and took as the premonitory period, simply the time, from the occurrence of the first liquid stool to the hour of admission. But even in this, where a physical and plainly-marked symptom was chosen and inquired into, many difficulties presented themselves. There is among the poor, and was even at the time of cholera, warned as they were by every possible means, a strange apathy about this condition of bowels, and many patients had evidently taken little, or no note of the circumstance, so that it was often quite impossible to make out clearly, whether there had been diarrhœa, and how long it had lasted; in other cases, the patient was brought, too far advanced in collapsè to be questioned, and by people, who, though living in the same house, hardly knew his name, and could give no in-

formation about his state of health, previous to the attack, when they had found him perhaps on the stairs, or he had managed to summon help to his room: other cases were brought, equally collapsed, by policemen, who found the poor creatures lying out on the pavement, scarce able to speak, in fact, all but dead: still, as it was at the time, a matter of great interest to determine the relative number of warned and unwarned cases, such pains were taken to arrive at a true and useful result, that I have no doubt in offering the following as a real statement of facts,—particular, as in order to keep the aggregate quite free from any vitiation, I have left out all cases in which no reliable information could be obtained, whether such appeared a case with, or without, premonitory diarrhœa. The period of warning is taken from the first liquid-stool to the moment, when first seen at the hospital in an algide state; and, although the patient may have been algide for an hour, or more previous to his being brought to the hospital, yet did this mode appear to me likely to admit of less falsification, than if I had taken the loose and exaggerated statements of friends, as a guide to the period when collapse had supervened. The results thus obtained are perhaps worth some attention.

In the first place, nearly half of those, admitted with algide cholera, had suffered from a mild and painless form of diarrhœa for a period varying from two days to three weeks, they had then been seized with a much more acute form of the disease, namely, with active vomiting and purging, with cramps. This state has generally in ten hours, or less, passed into the collapsed stage of cholera. About a third of the whole number reported were attacked, without the previous warning of mild diarrhœa, with the active purging and vomiting as mentioned above, and they generally became collapsed within eight hours, and their disease ran a more rapid course, than those in which the warning was longer. Some few had a premonitory stage of more than ten hours, and less than twenty-four; and less than one tenth of the number were attacked suddenly, or less than two hours elapsed, between the time of first warning, and the supervention of collapse, which short period I have taken to be analogous to a sudden attack. This form runs a very rapid course either to dissolution, or if the treatment be vigorous and successful, to almost as sudden a cure.

We then may place the experience in a tabular form—

Sudden attack of cholera	8
Warning diarrhœa of less than 10 hours	19
Warning diarrhœa of less than 24 hours	23
Diarrhœa of some days	35
Total number of cases of algide cholera	85

Whence it is seen, that the larger number of cases had been for some time previously affected with diarrhœa, and the general course of these is, that they are subsequently attacked with an acute form, that within twenty-four hours, generally within ten, ends in cholera algida. The next most common mode of attack is by a sudden seizure of violent purging and vomiting, of which altogether we have 42 cases, 19 of which end in collapse before ten hours are over; 23 last beyond ten hours and under twenty-four; but it should be said, that among those 23, 7 do not go beyond twelve hours. It should also be observed, that I have some cases of cholera, in which no accurate knowledge could be gained, some of which, I believe, belong to the first class, but most to the last; still, as the knowledge was not sufficiently accurate, they have been altogether excluded.

Thus it appears that among 85 cases of algide cholera, there were but 8, which were attacked so suddenly, that in less than two hours after the first warning, the algide symp-

toms had supervened, 77 of them had a warning of more than that time, mostly of much more; ample time being in general given for the administration of medicine, or if necessary for removal; and that this fact is most important, will be seen at once, since the treatment of cholera, before the algide symptoms supervene, is infinitely more successful, than when these have once occurred; the practitioner, moreover, will acknowledge the advantage, in whatever stage the disease may be, whether that of simple diarrhœa of some days' standing, or of the violent purging and vomiting immediately preceding the worst symptoms, of instantly applying every remedy applicable to the particular case. That the patient with the latter acute symptoms is suffering from cholera Asiatica, cannot, I suppose, during the prevalence of such an epidemic, be doubted, because if not treated, the algide stage supervenes, but yet, when there is no epidemic of Asiatic cholera, a patient with the same symptoms left untreated may perhaps die; but the form of disease continues to differ from Asiatic cholera to the very end. Hence our great difficulty of separating the two diseases, since what is at one time a stage of Asiatic cholera, is at another simply diarrhœa, or English cholera, and from

this different tendency in the disease, may be adduced the reason of a difference, which should be observed in the treatment of such forms of disease, when Asiatic cholera is or is not present. The tendency, of this urgent form of diarrhœa, to run into a sudden state of deep collapse, with intense cold and loss of pulse, a state similar to the algide stage of cholera, should teach us to endeavour, besides stopping the diarrhœa, to obviate this tendency, and to prevent, by every means in our power, any exposure or action, which may hasten on this state; so important does this indication appear to me, that I am convinced of the inefficacy of mere medicinal treatment, simply directed to the purging, unless this indication be also taken into consideration; the danger guarded against, and a constant watchfulness employed, that the first symptoms of the true algide cholera, if they after all supervene, may be met with promptness and decision, and that no time be lost in preparations, when the end may be approaching.

In the first place the patient should be, if possible, removed to a healthy locality, if it seem probable, that the atmosphere of his dwelling was such as to breed the disease; since it can hardly be hoped, that a cure can

be effected, while the patient still continues to breathe, every moment, fresh doses of the very poison, which is in his system, and which first set the malady at work. This removal should be ordered, and carried out as soon as possible; for, if the strength continue to decrease, we may come to a time, when it will be impossible to move him without imminent danger, while his remaining is fraught with equal peril. In the removal, care must be taken, that he be well protected from the cold, by wrapping him in several hot blankets, by placing hot bottles or bricks somehow in contact with his person, as on the lap, under the feet, &c.; and a vehicle should be procured, which, as much as possible, permits the patient to lie in a recumbent or reclining posture, as may be partially managed with a cab, by placing a stool between the two seats.

In the next place, it is a grand essential, to keep up the temperature of the patient, since the tendency to become cold is certainly a great characteristic of this disease. Hot bottles should be placed to the feet and inside of the thighs; india-rubber bags filled with hot water to the loins and abdomen. The bed-clothes must be ample, and should be so arranged, by means of an extra blanket wrapped

round the shoulders, or passing round the chest and under the arms, that he does not bare that part to the cold in his restless jactitations, nor in rising on the elbow to vomit, as he may, perhaps, frequently be obliged to do. A mustard poultice—partly for the sake of exciting warmth, partly as a counter-irritant—may be applied to the abdomen, and kept on till the skin is well reddened; then, if the circulation remain very weak, and there be still coldness of the extremities, it may be shifted to the chest.

Thirdly, the patient ought to be kept, as strictly as possible, in the horizontal position,—a condition as important to the patient, I am convinced, as any one indication can possibly be. I am quite sure, that I have seen the action of the best remedies, and the benefit of the most well-directed plans of treatment, negatived, by allowing the patient to get up, and sit on the night-stool; for not only does the rising out of bed expose the body to cold; but the upright position favours alvine dejection, and, what is more imminent, it not unfrequently, in this weak state of the patient, gives rise to fainting, which leads at once, by a short cut as it were, into the collapsed or algide stage of cholera, which it is our great endeavour to

avoid. Therefore it is always advisable to have the bed-pan used on such occasions ; and the benefit, or rather the avoidance of evil, will be found fully to repay the extra fatigue of nursing.

Medicines should also be directed, partly to the same end as the other remedies, partly to the stopping the drain from the bowels. Thus, the prescriptions should be aromatic, stimulant, and astringent, and not such as merely clog the bowels by a semi-mechanical action, like chalk mixture, to which there are many objections, particularly in the form of disease now under consideration. Of all medicines in the Pharmacopœia, this is about the clumsiest. It may plug the bowels for a time, but then is, by its irritation, pretty sure to induce a second unhealthy form of diarrhœa, nearly as bad as the first ; or, if it do not stop the diarrhœa at once, is perfectly certain to make it worse, by hanging among the villi of the intestines, and keeping up a constant irritation. There is quite enough chalk, for any useful purpose, in the aromatic confection, and that amount is the utmost which, according to my experience, is likely to benefit the patient.

If there be but little vomiting, the treatment is of course more easily carried out, than when

this is a constant and troublesome symptom. It appears a useful practice to give at once four or five grains of calomel, or of chalk and mercury, in pill, with one grain of opium ; this may be followed by a draught, consisting of aromatic spirits of ammonia, with laudanum and catechu, or, if it please, aromatic confection may be added ; which draught may be repeated every three or four hours, as the urgency of the case may require. Often, where these means do not take much effect, benefit may be derived from the starch and opium enema, only it should be used immediately after the passing of a motion, or, at all events, not while the patient feels any desire to stool. The quantity of the enema should of course be small, that it may be the longer retained in the bowel. In the mean time, the patient should be well fed with arrow-root and port wine, beef-tea with arrow-root in it, rice, &c. Brandy and port wine may be pretty freely administered. If, after some time, these means appear futile, acetate of lead and opium will often succeed. In fact, the treatment must be varied according to the circumstances of the case, and every remedy usually resorted to in diarrhœa may be used ; but more attention than is usual in such cases must be directed to

sustaining the circulation, and keeping up the due warmth of the skin.

Vomiting, however, is often a constant and very distressing symptom; it may come on before the diarrhoea commences, or some time afterwards, the matters ejected are at first mixed with food, and then become a yellow-greenish fluid, mixed with the medicines or whatever ingesta have been taken. In these cases, it is most important to observe, that very little bulk, either of medicine or nourishment, be given at a time. Thus the same pill (Hydr. Chlorid. gr. v., Opii, gr. j.) may be given alone, that is without any other medicine or any fluid, unless the patient cannot swallow the pill without it, when he may wash it down with a tea-spoonful of sal volatile and water. If it be vomited, wait a little, then give another, still not letting him have more than a tea-spoonful of fluid after it. Ice may be given in small quantities, and will often be found efficacious; brandy, or ammonia and opium, in effervescing drink; but in a very small quantity of fluid, say two table-spoons of soda water.

If vomiting still continue, hydrocyanic acid may be given, in an effervescent form, and ice may be used; creosote may be tried, though, I believe, it will generally be found to fail, where

other means do not tell. The acetate of lead treatment, on account of the small bulk, in which the medicines can be administered, is, in these cases, well adapted to check the purging. But when, as sometimes happens, these pills cannot be retained, the best plan is to rely, for this purpose, on one or two starch and opium injections, and to direct the whole attention to the vomiting, and to keeping up the patient's strength under its depressing influence. External warmth, mustard poultices, brandy, ammonia, soda water, hydrocyanic acid, and above all, ice in small lumps, are the remedies most commonly useful; and great care must be taken with the management of ingesta, by which means only, the patient can be fed, he being often able to take and retain with benefit one table-spoonful of food, arrow root and brandy for instance, when two would not only make him sick at once, but might probably render the administration of that particular form of food henceforth impossible—a point of vast importance, since variation of nourishment is an object of no inconsiderable moment.

A symptom of which we have not hitherto spoken, but which is often combined with this choleraic diarrhœa, is the partial or total suppression of urine. It has not been alluded to,

because in a future page, there will be more especial occasion to mention it, and it is even now brought forward here chiefly with reference to its great value both as a pathognomic and prognostic sign. Where the patient, throughout his attack, passes without pain, a fair amount of clear water, we may feel, that the algide stage of cholera has not yet approached, and that time is yet given, that we may ward it off. On the other hand, if the urine suddenly cease or become very scanty, it is a signal, that worse symptoms may be expected, and that the cholera poison is now taking firm hold of the system. When a patient is brought with acute choleraic diarrhœa, who says that he passed water before the attack came on, but not since—when after some hours' treatment, his pulse is stronger, the vomiting or purging, or both have diminished, we may very fairly entertain a hope that he is safe, but we can never feel anything like certainty, as to his fate, until he have passed water. We shall come to speak more of this subject by and bye, and all said now thereon would be, but forestalling what must be more fully discussed hereafter; therefore I must now be contented with saying, dogmatically, that until urine be drawn off by the catheter, or voluntarily passed,

the patient is not safe; but if it be secreted freely, and the intestinal disturbance be decreased, about six or eight hours after the first attack, we should be greatly encouraged to continue our efforts, and have every reason to hope for the best. But generally, if the secretion of urine have ceased, and the illness be longer, water may not again pass for the third or fourth day after its commencement; but then, even, if the diarrhœa be checked, there is no ground for despair, for it is seldom that after an illness, such as we are now considering, the urine does not, about this time begin to flow; but after the second day, every twelve hours adds greatly to the anxiety.

One point to be observed, when the diarrhœa is checked, is that the bowels do not get stopped; and it will generally be necessary to procure action with some mild aperient, or, which is much better, with an enema. Let me illustrate the treatment, &c., with the following cases.

CASE I.

J. K— has had diarrhœa for four days; but at six this morning he was seized with more violent purging, and vomited once; he has been purged nine times; has a great deal of griping.

Jan. 12, 3 $\frac{1}{2}$ p.m.—Found that he had been going to the privy every time of purging, and was not even in bed, but in his clothes, sometimes walking about the room, sometimes setting down; pulse 92, small, soft; was put into a warm bed, and is not to get up, but to use the bed-pan; (Arrow-root; Beef-tea; Brandy, $\bar{3}$ ij; Conf. Aromat., $\bar{3}$ ss; Tinct. Opii, $\mathfrak{m}$ xv; Spt. Ammon. Aromat., $\bar{3}$ j; Mist. Camph., 2^{dis} horis.)

8 p.m.—Has vomited once; no motion; no cramps. (Cat. Sinapis Epigastrio.)

12 p.m.—Two feculent dejections; has been sick once since 8 p.m.; complains of great thirst; pulse much the same; tongue coated brown.

13th, 8 a.m.—Passed no motion since nine last night; no urine.

12 p.m.—No motion; no urine; nor has he been sick; pulse 85, stronger.

14th.—Enema Olei Ricini, $\bar{3}$ iv, which brought away two dejections; he says he passed water with the first, but this is doubtful.

12 p.m.—Is very drowsy; pulse 90, rather hard; eyes heavy, and a little full; tongue still coated.

15th.—Passed much water; he may get up this afternoon.

CASE II.

G. B—, æt. 17, has been well in health till 11 a.m. to day, when he was taken with purging and vomiting; he says, that since then, the bowels have been moved twelve times, viz. in five hours; and he has vomited twice.

9th July, 4 p.m.—Feet a little cold, but he complains of griping; no cramps; tongue coated, brown in the centre, white at the edges; pulse 96, feeble, small; he was put in a warm bed, and not allowed to rise; a large mustard poultice to the epigastrium; (Sumat. Hydrarg. c. Cretâ, gr. v; Opii (crude), gr. j, statim; Spt. Ammon. Aromat., ʒj; Tinct. Catechu, ʒj; Conf. Aromat., ʒss; Aquæ Menth. Pip., 2^{dis} horis.) He took the draught a quarter of an hour after the pill; threw it up instantly, but retained the pill; leave him quiet, and let him have arrow-root, with an ounce of brandy in the teacupful; to take a little now and then; small pieces of ice.

9 p.m.—Has had one motion; feels very sick, but does not vomit; likes the arrow-root and brandy, but dare not take much; repeat the pill; pulse the same; no urine, he says, since when he went to bed last night.

12 p.m.—Another motion, but only a small

quantity came away; he does not feel so sick (Tinct. Opii, $\mathfrak{m}$. xx; brandy, $\mathfrak{z}$ ss; iced water, $\mathfrak{z}$ ss, immediately); retained the draught; (Sumat. Tinct. Opii, $\mathfrak{m}$ xv; Spt. Ammon. Aromat., $\mathfrak{z}$ j; Tinct. Kino, $\mathfrak{z}$ ss; Aquæ Gelidæ, $\mathfrak{z}$ j, 2^{dis} horis.)

July 10th.—Has not been sick; two motions during the night; complains of extreme thirst; pulse 88, rather stronger; some urine has been passed; soda-water.

9 p.m.—No motion, nor sickness; beef-tea.

11th, 8 a.m.—Goes on well; tongue cleaner; pulse 80, stronger.

9 p.m.—Goes on quite well.

12th, 8 a.m.—He is getting stronger, and may now be considered convalescent.

These two cases show different degrees of diarrhœa and sickness; neither, difficult to manage; and in both I conceive as much, or perhaps more, must be attributed to the position and warmth, as to the medicine. In the latter case, in fact, no medicine was given, except the pill, for eight hours after his admission, and he was only purged twice, although, in the five hours previously, he had been purged twelve times; then a sort of feeler was ventured upon—brandy and water, with laudanum; and when that was retained, an

astringent tried: thus in time the patient's stomach was enabled to bear medicine and food; and urine having been passed, he was considered safe.

CASE III.

W. E—, æt. 42, a strong powerful-looking navigator, has had disorder of the bowels for the last two days; but there has been no pain, and he has not applied to any medical man. Within the last two hours he has been seized with violent sickness and purging, and cramps came on half-an-hour afterwards. The stools have been brown and like pea-soup. He has anxious countenance; he says there is but little pain in the abdomen, or anywhere else, but that he feels quite weak. Pulse very feeble; tongue coated; verging to collapse.

9 p.m.—Has had two bilious motions, and since 8 two rice water; he is very restless; voice hoarse; is very cold; has a great deal of cramp.

7 a.m.—Came to visit him early this morning; but it was too late—he had been dead a quarter of an hour.

The treatment is here purposely omitted, as it had probably no effect one way or another. The case is given simply as an example of the

manner in which diarrhœa runs into cholera. The man did not appear worse, than the lad in case No. 2. In one the purging all but stopped; in the other it went on, the stools became more liquid, at last watery, and just yellow, as if they had washed the last dregs of bile from the intestines, then quite colourless or rice water.

This, indeed, is the usual manner in which cholera supervenes upon diarrhœa. The disease may have lasted some days without vomiting, even purging may only occur two or three times in the day and night; then comes a sudden attack of more acute diarrhœa, with abundant and frequent dejections, and with more or less vomiting; at last follow the symptoms of algide cholera—the motions lose even their slight consistency and their admixture of food, the bilious colouring becomes less and less, and at last rice water; cramps set in, the pulse falls, the skin becomes cold, inelastic, ashen coloured, or leaden, and the cholera algida has fairly commenced.

CHAPTER III.

SYMPTOMS AND PATHOLOGY OF ALGIDE CHOLERA.

THE symptoms of the Algide stage of cholera are so constant, and so unvarying in their course, that a general description will embrace nearly all cases of the disease. They are purging of a fluid, the appearance of which is justly compared to water, in which rice has been boiled, thence called rice-water dejections; vomiting of matters different in colour and appearance, but which are always more or less clear; intense thirst; coldness of the surface, tongue, and breath: a coldness which exceeds that of the corpse, and gives a peculiarly unpleasant sensation to the hand, laid on the person of the patient; blueness of aspect, and shrivelling of the skin, particularly of the hands and feet;—these, together, cause the peculiar cholera aspect. The eyes are suffused, sunken, and surrounded by a margin of a

dark blueish colour ; the lips are deep coloured, as though stained with the juice of black currants, or of the black-heart cherry ; all the folds of the skin, that between the side of the nose and the corner of the mouth, and the ears also, are blue, while the rest is very pale ; the hands are puckered, like those of a washerwoman, except that they look blue with cold ; the skin is sometimes dry, sometimes clammy and wet ; the pulse is very feeble, often imperceptible, while the action of the heart, although low, does not appear to be depressed, in an equal degree with the pulse ; but its second sound is sometimes absent. There are generally severe cramps, chiefly in the calves of the, legs, and extensors of the thighs. The patient is either apathetic or restless ; and there is also suppression of urine. In many cases we remark a general obtuseness of the senses, in which that of hearing is the most observable, not so much, I believe, because it is more affected, than the other senses, but because it is a more easily discoverable loss, for unless the patient complained, that sight or sensation were lessened, we should not know, that it was so ; but when we find it necessary to raise the voice, the fact of his being deaf obtrudes itself upon the mind.

Now, the peculiar fluid, which the patient

passes by the bowel, is generally slightly alkaline, but often neutral; it contains white opaque shreds, looking like badly-eliminated fibrine, often has no, or a very slight, odour, like foul perspiration, but I have once or twice found it offensive smelling, like a dirtily-kept fish shop in the summer; sometimes it is slightly yellow, particularly on its first appearance, as though it had rinsed, from the intestines, what little bile might still hang about them; it is often expelled with much force, as from a syringe, without irritating the anus or causing tenesmus, and is sometimes in great quantities, particularly when the patient is in the erect posture; thus the cushions of cabs, in which he has been conveyed to the hospital, have often been sopped, and the fluid has run down to the bottom of the vehicle. This state of bowels supervenes by degrees upon the bilious purging, which usually ushers in the malady; the stools becoming less and less coloured, as the case proceeds, till perfectly devoid of bile. The commencement of rice-water purging, and of collapse, are about coincident; the sediment and the fibrine-like shreds, when examined by the microscope, are found to consist of epithelial cells in different degrees of dissolution.

Vomiting is, in amount, a very variable

symptom; it occurs nearly in every case, but sometimes ceases very early; often it plagues the patient incessantly, keeps up the prostration, and sometimes frustrates every effort at alleviation. The vomiting is at first bilious, afterwards consists chiefly of what is taken, and then, if he survive long enough, assumes a bright emerald green hue, not unlike the colour and appearance of cajeput oil. With this vomiting fierce thirst is combined, the patient will, if allowed, gulp down a quantity of fluid, and as soon as it have touched the stomach, will throw it up again, drink again, and so on. This sickness often occurs without painful effort or retching; the diaphragm or abdominal muscles do not seem to be called into play; but it appears, as though a sudden painless contraction of the stomach itself pumped the fluid forcibly from the mouth.

There is something peculiar in the coldness of surface, tongue, and breath; it is greater in sensation, than that of a corpse, or of polished metal, while the expired air is colder than the surrounding atmosphere; I take blame to myself, that I never actually tested the temperature of a patient's body or breath with the thermometer, though the instrument is perhaps not as good a guide, in these sort of circumstances, as sensa-

tion, but there can, I believe, be no doubt, but that the temperature is very low; the skin so far loses its elasticity, that if a fold be pinched up, it continues erect, and an indentation with the finger remains whiter, than the surrounding parts. The surface is often clammy and bedewed with perspiration, often dry and hard; and some differences in the results of the cases, in which one or the other of these states has occurred, have led me to attach some importance to the presence or absence of perspiration. If the victim of this complaint die in collapse, the corpse becomes warmer after death, often much warmer, than after any other mode of dissolution, and may remain so for two hours or more, and then will turn as cold as the body of a dead person usually is. Rigor mortis is sometimes (noticed in two instances), though seldom, absent. Dr. Parkes has correctly estimated the fatality, as a symptom, of a local return of temperature, particularly if the spot where this occurs be defined, by a sharp boundary, from the surrounding cold parts, so that there be no melting of the warmth into cool, and then cold, but a sudden and trenchant line of demarcation between the two. It has seemed, in one or two instances, that sensation had quite left the parts, which had

become thus suddenly warm ; but the patients, though not comatose, have been too oppressed for me to make perfectly accurate observations on this head.

The blueness of skin, and the peculiar appearance of the face and hands, when once seen, in a strongly-marked case, will never be forgotten, it gives a peculiarly unpleasant, horrid aspect, sometimes as though the patient had been starved, and when combined with the anxious expression, as though he had been terrified into insanity—for the suffusion of the eyes imparts a wild look, and the discoloration about the mouth, an appearance such as Virgil imputes to his Harpies. The hands shrivelled like a washerwoman's, blue with dark nails, with crooked, stiff and claw-like fingers, either soaked with perspiration, or dry and hard, will be recognised, as soon as seen, for choleraic.

The pulse is always very low, but generally remains regular, as long as it can be felt ; the only peculiarity is, that it usually gets extinct before the first sound of the heart has lowered as much in comparison—which probably depends on one of two causes, either, that the blood is too thick to travel through the vessels, or, that but very little finds its way to the left side of that organ, which contracts with considerable force on the

small quantity, which it does contain. It is, perhaps, to the first of these causes that the cessation of the second sound is due. The sufferers will remain alive for hours, after all pulse at the wrist has ceased, and will, even in that state, answer questions quite rationally, for the intellect remains sound, to a very late period, and the condition of brain is not coma, but rather a state of utter listlessness and apathy.

The accession, intensity, and duration of cramps are extremely variable, nor is, I believe, much importance to be attached to their presence or absence, either as a diagnostic or prognostic sign. In the beginning of the last epidemic they were invariably present, and generally violent. In July and August of 1849, while the disease was chiefly raging, they were often absent, and when they occurred, were often slight and hardly complained of, though they were frequently violent. In some of the worst cases, there had never been cramps; in some of the milder ones, they were most distressing. No synchronous relation, between the purging and advent of cramp, could be detected; but there seemed to be some proportion between the amount of discoloration of the skin, and the presence, absence, or intensity of this symptom.

The patient can often remember some definite time, when he last passed urine, either "last night before he went to bed," or "this morning on rising," according as he was attacked in the early morning, or in the afternoon; or he may have observed, that he did not make water at either of those times, which will afford us a period, whence to date the duration of the suppression; but as this symptom will come more especially under consideration, when the consecutive fever is spoken of, it will be useless to examine it, more minutely, at the present moment.

The deafness, and obtuseness of the senses, generally, is of no practical import, and its amount is not sufficiently estimated to render them useful, as diagnostic symptoms, particularly as the disease is so well marked, that it is at once recognisable.

Perhaps, before entering into considerations concerning the treatment of this disease, it will be well to say a few words concerning its pathology, as apparently to me most near the truth, with regard to its diarrhœa-like commencement, its dependence upon malarious influence, and the nature of this peculiar algide stage.

Most pathologists of the present day have

agreed that this form of cholera is a blood disease, and certain it is that the blood undergoes certain changes, which appear in a great degree to alter its physical character, and these appear to be brought about by the absorption of a poison from the air; and so far, doubtless, there is every appearance of truth in the theory; but there is one awkward point, which should be explained, if possible, and at all events should not be lost sight of, because otherwise the fact of the disease being resident in the blood, is not by any means a proven one.

In 85 cases of algide cholera, 35 had had diarrhœa some days previous to the attack; and 23 more had suffered in the same way for more than ten hours and less than twenty-four; 19 had a warning of between ten and two hours. Every one of these cases ended in algide cholera. I have short notes and entries of 50 cases of diarrhœa, ranging from a few hours to a few days' duration, which have been treated, and not one of which ended in cholera. The symptoms, in each division of diarrhœa, being probably so alike, that no one could say beforehand, whether or not, any particular case, left untreated, would, or would not, end in algide cholera, we may fairly call these,

134 cases of the same disease, namely, the commencement of cholera Asiatica. Some have been cured, before arriving at the algide stage, some have not, and those that have, were treated simply by the means that correct any diarrhœa, namely, astringents, opium, and such like.

But now, how is this compatible with the theory of its being a blood disease? The poison is in the blood, when the purging and vomiting commences, yet how is it, that the patient recovers with no further bad sign, simply because the discharge from the bowels is checked? What, under these circumstances, becomes of the poison? In smallpox, measles, erysipelas, &c., the poison causes some disease, which runs its course till either it be evolved, or lose its power; so with typhus, rheumatic fever, whooping-cough, &c. ; but in this, there is no necessity, that the disease should run through all its stages, we can check it easily at first; when it is checked, if the diarrhœa have been slight, the patient is as well, as though he were not poisoned. If, when the malady is more severe the secretion of urine stops for a few days, and then is restored, the patient does not appear actually to have gone through a part of the most deadly disease we know of, the poison

has lost its power by means of an astringent medicine. No, there is something more here than simple blood disease, as in smallpox or measles, though there is no doubt but that the blood is to a great degree, and most seriously, affected; yet that affection of the blood, which leads to the physical changes therein, and to the algide symptoms of cholera, does not take place till some hours after the absorption of the poison, and the poison is perhaps incapable of producing such symptoms, or begetting such changes, unless aided and abetted by intestinal disturbance, because by checking this we prevent the supervention of changes in the blood, and of symptoms of algide cholera.

Three cases, which in my opinion are worthy of every attention, are here given, from which, perhaps, a hint as to the probable signification of the collapsed stage of cholera may be taken.

CASE IV.

Cholera.—Michael Kelly, æt. 11, admitted into Clinical Ward, St. Thomas's, 23d October, 1848, 5½ p.m. His parents live at Tothill-court, Bermondsey; he is employed in selling fruit to the sailors at Wapping, and along the river. His brother died three days ago of cholera,

after five hours' illness, and the body still remains unburied in the house; it is said that another child, and also the father are ill.

5½ p.m.—He was taken, about two o'clock, with violent purging and vomiting. When admitted (3½ hours after the attack) he was very cold, fingers slightly shrivelled; not much blueness, eyes sunk, nose fallen, voice almost whispering. Pulse very feeble, 120. (Diet lactæ; beef-tea. Catap. Sinapis ampla abdomini; Sumat. Liq. Opii Purif., 3ss.; Sp. Ammon. Arom., 3j, ex aquæ Menth. Piper. statim et repet. horis.)

8 p.m.—Much warmer; has not passed any motion; has vomited a little yellowish matter.

10 p.m.—Is quite warm, and has but little cramp; has frequent desire for stool; but has passed neither motion nor urine. (Enema Amyli c. Tinct. Opii, 3j, statim utenda.)

24th, 8 a.m.—Has had four rice-water motions; no urine; vomiting and cramp have returned. (Acidi Hydrocyan. Dil., m̄v; Tinct. Catechu, 3j, e Mist. Camph. stat.)

11 a.m.—Passes his motions in bed; no vomiting; a little of urine has been passed. (Catapl. Sinapis epigastrio; Habet. Vini Rubri, 3iv.)

11 p.m.—Has passed a large quantity of urine;

no vomiting; two motions without faecal smell. Skin warm and moist; pulse 120, small and soft.

25th, 11 a.m.—Voided urine in the night; no motion since 4 p.m. yesterday. His breathing had become oppressed, so the Sister applied a mustard poultice to the chest. The respiration sixteen in the minute; tongue coated with brown fur; is very drowsy; pulse 100, small and weak. (Sp. Æth. Sulph., Sp. Ammon. Arom., aa ʒss, e Mist. Camph. statim et 8th horâ.)

11 p.m.—No motion, nor has he passed any urine since the night; he has had a common enema. (Hydrarg. Chlorid., gr. v, statim et repet. 6th horâ.) Began the medicine at 2 p.m.; catheter drew off half a pint of urine.

26th, 9 a.m.—Has been very delirious in the night. A catheter being passed drew off one pint and a quarter of urine, of which he had passed none, nor has he had any motion. Pulse 100, weak, steady. (Hydr. Chlorid., gr. v, stat.; Enema Olei Ricini statim; Catapl. Sinap. Pectori.)

4 p.m.—No motion; delirious, head hot. (Radetur capill., Ice to the head; Empl. Lyttæ nuchæ; Enema e Mist. Sennæ Co.)

10 p.m.—The enema brought away a small

quantity only of feculent matter. (Enema c. Olei Terebinthinæ, ʒij.)

27th, 9 a.m.—The greater part of the enema returned immediately, with some fæces; at 4 a.m. the bowels were relieved again; has been very restless during the night, but is now conscious, and rational when roused. Respiration 10 in the minute; pulse 108; tongue dry and coated; has passed a large quantity of urine.

9 p.m.—A copious dejection at 1 p.m.: and now again, with the motion, urine is voided. (Mist. Cretæ Co. si opus sit.)

28th, 10 a.m.—Four relaxed motions during the night; passes water; countenance much depressed; pulse 120; tongue dry and brown; he is very easily roused to take food. (Brandy ʒij.)

8 p.m.—Has been sinking all day, and died at 8 without a struggle.

CASE V.

James Mahony, æt. 16, Mint-street, Borough. Came from Ireland about four months ago; is in a destitute condition. Was seen by the physician in the Taking-in Room, and was sent up to the ward. Tongue brown; hot, dry skin; head-

ache; heavy look about the eyes. Pulse 104, weak.

25th, 4 p.m.—Had been purged twice since admission; was cold, and had vomited; face getting choleraic. (Sumat Mist. Olei Olivæ c. Mucilag. Acaciæ, ʒss, e. Conf. Aromat., ʒj, statim et 3rd horâ. Cat. Sinapis abdomini Vin. Rub., ʒvj; Arrow-root.)

12 meridiæ.—Rice-water purging continues: vomiting is worse; thirst violent; aspect livid; hands and feet cold, shrivelled, and blue; pulse hardly perceptible; great pain in abdomen. Removed to cholera ward. (Hot air bath 160° for one quarter of an hour. Spt. Æth. Nit. ʒiss; Creasot., mīj e Mist. Acaciæ.) The hot-air bath relieved the pain in the abdomen very much; extremities and face much warmer, and he seems much disposed to sleep. The heart's action is not much diminished, although the pulse is only just perceptible. Heart beats at 98; respiration 12; tongue brown in the middle, red at the edges.

10 p.m.—Is warm, and has not been purged; pulse rather stronger, 95; has passed a little high coloured urine; tongue brown; very slight tenderness on abdomen, but complains of noise in the ears.

26th, 8 a.m.—Breath icy; tongue and sur-

face quite cold; no pulse; eyes sunk, with blue discoloration all round them; perfectly listless, but understands what is said.

11 a.m.—Died.

CASE VI.

W. S—, æt. 20, had felt ill, with headache, and pain in the back and loins and shiverings, the day before yesterday, which continued much the same all through the day; and his bowels in the night, *i. e.* about 1 a.m. 27th of August, became relaxed; at 3 p.m. was seized with violent purging and vomiting, which were shortly followed by severe cramp, first in the calves of the legs, then in the thighs. He was removed to St. Thomas's Hospital at 10 a.m. 27th of August, 1849.

27th, 10 a.m.—The extremities are cold, blueish; hands shrivelled; countenance choleraic; pulse fluttering; tongue cold, pale and clean at edges, brown in the centre. (Dieta lactæ; Beef-tea; Arrow-root; Hot-wet-sheet; Brandy; Ice; Mist. Acid. Nit.-Mur. c. Syr. Pap. omni horâ.)

10 a.m.—Is warmer, but is much purged; suffers greatly from cramp; aspect less blue.

8 p.m.—Skin hot and dry; pulse weak, but quite perceptible, about 110; tongue dark

brown and dry; warm. No blue tinge of face, but rather general redness. Still sick, though the purging has ceased. Passed, in the urinal, about two ounces of high-coloured and peculiar-smelling urine, the odour like that of over-kept fish. Leave off the mixture.

28th, 8 a.m.—Still in much the same state; head very hot; he is somewhat delirious, and appears to think himself in some wooded country. The catheter drew off about four ounces of urine. Mr. Perkins came into the ward, and proposed removing the patient to Edwards's, as the disease had not the appearance of cholera. This was deferred, at my request, for ten hours; then if the aspect had not changed, the day porters might remove him, before leaving for the night.

2 p.m.—Is very restless, and complains of pain in the loins and extreme thirst; has rigors; pulse weaker. Wishes to drink in draughts, but is only allowed a little ice, or two table-spoonfuls of soda with brandy at a time, on account of sickness. No urine.

10 p.m.—Had just now a dejection; countenance anxious. The motion was passed in bed, not unconsciously, but it came too suddenly; it was not rice water, as it stained the clothes decidedly, but was very liquid.

29th, 10 a.m.—Had another motion in the night, very liquid, and slightly yellow, with white shreds in it. He is very cold; pulse almost imperceptible; visage blueish; eyes sunk, with dark rim around them; passes fæces involuntarily. Hot air bath to 180°.

10 p.m.—Was but little warmer after the air bath, and the pulse was but slightly, if at all, improved. Purging less; sickness stopped. Now, however, he has a little higher temperature; the pulse is just perceptible, but the action of the heart is more than that of the pulse. No more urine.

30th, 9 a.m.—Still alive, but almost unconscious; pulse much the same; appears only just alive; does not speak.

31st.—Has had one slightly-coloured evacuation, passed unconsciously; no urine; rolls his head about; teeth covered with sordes; pulse fluttering and irregular; puts the tongue out, when asked in a loud tone. Is moribund.

12 nocte.—Died about this time.

There is, without doubt, in the human mind, a tendency to speculation, upon grounds however slight; and hypotheses certainly are useful, even where they cannot be proven, since they call forth facts either to support or to re-

fute them ; and as, in either case, they thus tend to elucidate truth, even where they themselves are not true, they have their special advantages. Now, in considering these and other such cases, and in coupling with them, the fact, that typhus fever increases in any country, as cholera approaches, and, moreover, that that fever acquires a greater and greater tendency to abdominal complication, we must be struck with the close connection between the two sets of diseases ; and the fluctuations in the cases quoted lead us still further towards the supposition—which is not offered as a truth, but simply as an *hypothesis*—that under the influence of the particular poison, typhus fever becomes a virulent remittent, the cold stage of which is algide cholera, that this particular form is always accompanied by a peculiar alvine disorder, or, perhaps, is rather preceded, and in part induced, by an action causing alvine disturbance ; and this idea gains additional weight, when it is remembered, that in Hamburgh and other Continental towns, remittent fever was a forerunner of the cholera. The difference, in reality, between intermittent, remittent, and continued fevers, is really very small ; so slight, that in the same climate and in the same malaria, a difference of temperature as to sea-

son, will change the aspect of the disease from the one to the other. The view most favoured by medical men, practising in warm climates, where yellow fever is rife, is that this disease is a remittent, and has, apparently, not unfrequently an algide stage, as mentioned by Dr. Bartlett, in which that phase of cholera is closely imitated—in which, even, it would be very difficult to distinguish the one disease from the other, except by judging from the prevalence of either malady. Moreover, although it at first sight may appear paradoxical to speak of the remittent quality of *continued* fever, I conceive, that all medical men will acknowledge to have occasionally seen continued fevers, in which was a greater or less tendency to remit, only shown, perhaps, by an irregularly periodical shivering, slight exacerbation, or sweating; and most readily can it be conceived, that the addition of another poison might cause such fevers to intermit altogether, and add to them a cold stage of an intensity like that of cholera.

In the cold stages of a regular intermittent, ague for instance, the blood leaves the surface of the body, causing contraction and shrinking of the face and hands, and a peculiar rough sensation of the skin; and in cholera, the blood leaves the surface and remains pent up in the

internal cavities ; the body is cold in both : in time, if all goes well, warmth returns, which soon becomes heat and fever. The difference of this symptom, in fact, is more in degree than kind. The cholera patient often dies before the hot stage comes on, and never lives, as far as my experience goes, through a second cold fit to the next hot ; the ague patient survives very many. Thus, though no one could say, with an approach to truth, that cholera is merely a deadly form of ague, yet it appears true, that it is a peculiarly deadly disorder with a decided remittent type, and that the sufferer is apt to die in the cold stage, or before the circulation, disturbed by the great power of this chill, can become fully restored. In all cases of cholera which live beyond the algide stage, a consecutive fever supervenes. In the three cases given above, and in four others at St. Thomas's Hospital, the notes of which are now by me, the changes from one to the other, and back again to the cold stage, are well marked.

As in the cold stage of ague, the blood remains in the internal parts, so does it in cholera ; but apparently a certain disorder, either of the intestines or of the blood, causes a tendency to the secretion of fluid therefrom,

the congestion and the stagnation in the larger vessels, during the cold stage, increase this tendency, and the serum of the blood constantly runs off into the intestine.

Drs. Reinhardt and Leubuscher, who published in 1849, their observations on cholera,* give a most detailed and elaborate account of the appearances found in those dying in all stages of the disease. In those who died in the algide stage it appears, that most internal organs suffered from venous congestion, situated, not so much in the venules, as in the large veins of the part. Thus, the lungs and the liver are empty of blood; but all the right side of the heart and the vessels leading to it are gorged therewith, as Dr. Parkes also has observed. The mucous membranes generally, but those of the chylo-poietic and of the urinary system in particular, are congested, even to the venules; the left side of the heart and its vessels are comparatively devoid of blood. Indeed, to state the facts broadly and in few words, there was a universal internal congestion, which appeared, as though beginning in obstruction about the right side of

* Virchow's und Reinhardt's, 'Archiv für pathologische Anatomie, und Physiologie und für klinische Medicin,' 2ter Band, 3tes Heft, S. 479 und ferner.

the heart, for all in its neighbourhood was full, and the left side of this organ was empty, as though it had, through life, retained power to pump away what little blood entered its cavities. Indeed, Dr. Parkes has remarked, that, when the heart was exposed after death, its left side contracted violently, showing that its vitality still lasted, and that the congestion was not due to want of cardiac power. The blood itself was thick and treacley, often coagulated into masses, and dark in colour. It seemed that, in the systemic vessels, it underwent certain changes, that rendered it more solid and unable to circulate further; so that, when it was all poured together into the great vessels, partial coagulation and stagnation took place therein, leaving the external surface of the body, and its capillaries, nearly devoid of blood, thus causing contraction and cold. The same condition of surface and the internal congestion, but in a less degree, takes place also in the cold stage of ague, and the comparison between the two diseases is assisted by the morbid anatomy of each.

However, as in all fevers of the remittent type, irregularities not unfrequently occur, so also in cholera; for the consecutive fever, or the febrile stage of cholera, which is analogous

to the hot fit of an ague, may be very slight and evanescent, in comparison to the intensity of the algide symptoms, or the cold stage may be short and slight, in proportion to the great amount of consecutive fever—there may even be no cold stage, no rice water purging, but simply violent bilious cholera, with vomiting and suppression of urine, followed by so great an amount of febrile disturbance, that, together with the entire disappearance of that secretion, it carries off the patient. Now, it cannot be said, that these irregularities militate against the truth of the hypothesis; for I contend, that they rather aid in its establishment, showing, as they do, that even the unmistakeable cold stage is not a necessary part of Asiatic cholera; but only one phase in the disease,—a very fatal one it is true, still, perhaps, not much more so, than the consecutive fever; and it is not so essential a portion as that fever, since no case that lives beyond the cold stage escapes the hot one; and the following cases had no, or a very slight, algide stage, but glided almost at once from the premonitory diarrhœa into consecutive fever:—

CASE VII.

Andrew Loutit, æt. 44, ship-clerk, landed from the Orkney Islands eight days ago, and began to have slight diarrhœa two days afterwards. Last night was attacked with vomiting and purging, with cramps in the legs; these recurred this morning. He was admitted May 11th, 1849, at 12 m.

Half-past 2 p.m.—He is in no pain now; surface generally warm; feet cool; cheeks warm; hands slightly shrivelled; pulse 96, weak; tongue coated; much thirst; no urine voided to-day; evacuation at 1 p.m.; (D. L. Cataplasma Sinapis. Abdomini; Vini Antim. Pot. Tart., ʒss; Pulv. Cretæ Co. c. Opio, ʒj; ex Aquâ Menthæ Pip. stat. et 2^{diæ} horis; Soda Water.)

10 p.m.—Three evacuations, thin and brownish, with a little blood in the last; frequent vomiting; severe cramp; skin warm; (Brandy, ʒij; Enema Ol. Olivæ, ʒvj; c. Tinct. Opii, ʒj, statim; repet. Cat. Sinapis.)

12th.—Five more motions since last night, of the same character; the cramp has disappeared; vomiting continues; has much thirst and headache; about an ounce and a half of

urine has been voided; pulse 88, regular; weak; tongue dry, coated in the centre, moist at the edges; (Empl. Cantharid. Epigastrio; Mist. Potas. Citrat. Effervescens, 4th; Brandy, 3ss; Plumbi Acetatis, gr. v; Morphiæ Acetat., gr. ss, stat. et 6th horâ.)

13th.—About 2 oz. of urine were drawn off by the catheter; has four brownish dejections, and has been repeatedly sick; pulse 84, weak; eyes hollow, and heavy looking; (Vin. Rubri, 3vj; rept. Enema c. Ol. Olivæ, 3vij; et Tinct. Opii, 3j; e Dec. Avenæ; Tinct. Opii, ʒx; Sp. Ammon. Aromat. Syr. Aurant., aa 3j; e Mist. Pot. Citrat. Efferv., 4th horis.)

14th.—In the afternoon of yesterday the enema was repeated; he complains of headache; he is drowsy; one motion last night, rather more bilious; vomited at eleven to-day; his skin is warm; no urine passed; has no cramps; pulse 80, large and weak; tongue coated; (Radetur caput. Ne habeat Morph. Acet. nec Opium. Sumat. Hyd. Chlorid, gr. v, stat. iterumque cras nocte; Empl. Cantharidis nuchæ; Brandy, 3iv.)

15th.—No motion since yesterday; pulse 80; vomited this morning, but less often; about an ounce of urine drawn off; headache and drowsiness continue; (Hydr. Chlorid., gr. v;

statim et hâc nocte; Ung. Iodinii Co. capiti bis die; Sumat. Gin., ʒiv ; no brandy.)

16th.—Lies on his back quite drowsy; pulse 80; tongue brown and dry; evacuation more natural; scarcely any urine drawn off; hardly to be roused to answer a question; (Hydr. Chlorid., gr. v, ter. die.)

17th.—Died at 6 a.m.; comatose.

CASE VIII.

E. L—, æt. 50, admitted 21st July, 2 p.m. Has had uneasiness in the bowels for three days. At 11 a.m. attacked with pain, then vomiting and purging, motions dark; matter vomited, dark brown. Has passed water freely, says she has had nine or ten stools in the last three quarters of an hour; surface warm; pulse rather weak, 96; tongue brown in the middle, white towards the edge. (D. L. Beef-tea, Brandy, Arrow-root; Cat. Sinapis Abdomini; Sumat. Hydr. Chlorid., statim; Tinct. Opii, $\text{ʒ} \text{xx}$; Sp. Ammon. Arom., ʒj ; Tinct. Rhei, ʒss ; ex Aq. Menth. Pip., stat.; Tinct. Opii e Mist. Cret. Co.; post sin. sed. liquid.)

22d, 10 a.m.—Vomiting, purging, and cramp continue; has passed her urine; countenance

anxious, but not blue or sunken; surface warm; pulse weak, 85.

10 p.m.—Purging a little subsided, says the medicine sticks about her mouth, and makes her sick; passed no urine since 7 a.m. (Tinct. Opii, $\mathfrak{m}\text{xx}$; Confect. Aromaticæ, $\mathfrak{z}\text{j}$.)

23d, 10 a.m.—Complains of headache, and is drowsy; has passed no water; the vomiting and cramp have ceased; pulse 100, weak; she has great thirst; (Omit. Tinct. Opii; Habeat Soda Water, Port Wine; Sp. Ammon. Arom., $\mathfrak{z}\text{j}$; Tinct. Calumbæ, $\mathfrak{z}\text{j}$, e Mist. Pot. Citratis, quartis horis; Hirudines x , temporibus applican.)

10 p.m.—Still no urine; is getting delirious; countenance much flushed; face and hands of a copper colour; tongue dry and red, with a central line; pulse 100, feeble; hair to be cut; Catheterism.

24th, 10 a.m.—Catheter drew off no water; she declares, that she has voided her urine; the nurse has not found any in the urinal, and there is no sign of any having been passed in the bed, no reliance can be placed on what she says; pulse weaker, 100; skin hot.

10 p.m.—The purging still goes on, the chalk mixture and aromatic confection pass unchanged by the bowels.

25th, 10 a.m.—She has not been able to

take anything, but a little wine; she is unconscious, moaning, and rolling her head about with the eyes wide open; it is difficult to get a sight of the tongue, but it appears to be black, cracked, and dry. She died at half-past two.

CASE IX.

E. M—, æt. 21, admitted August 26th, 1849; 3 p.m.—Has had diarrhœa for one week, and three days ago was attacked with sickness. This morning at 10 a.m. taken much worse, has had colourless and white motions, they have changed colour twice, since first attack; has had cramp in the hands; is very thirsty; quite warm; tongue warm, rather coated; pulse feeble, 94; voice high-whispering and husky. (D. L. Beef-tea and Arrow-root. Cat. Sinapis Abdomini; Mist. Acid. Nit.-Mur., $\mathfrak{m}$ viij; c. Syr. Papaveris, 3j; omni horâ.

10 p.m.—The sickness is but very little relieved,—to take a little ice only, at a time; the nurse is to endeavour to check inordinate drinking.

27th.—Vomiting still continues, and the bowels have acted twice; the matter vomited is chiefly what is taken, with a clear yellow fluid (bile) added. (Tinct. Opii, $\mathfrak{m}$ xx; ex Aquâ Sodæ, 3iss.) She is to have about two

table-spoonfuls of iced soda water at a time, and small pieces of ice.

28th.—Vomiting still goes on, as soon as anything is taken, and sometimes without that cause; craving thirst; pulse 96, feeble; (Acid. Hydrocyan. Dil. $\mathfrak{m}$ v; Tinct. Aurantii, 3j; Aquæ, 3ss, statim,) rejected in five minutes. (Cat. Sinapis Epigastrio. Rep. post horas duas Haust. Acidi Hydrocyan.)

29th.—Is a good deal weaker; the face is very pale, with a deep dark margin round the sunken eyes; vomiting, perhaps, a little better, yet nothing but ice can be taken. (Sumat. Hydr. Chlor., gr. v; Opii crude, gr. j, statim;) the pill was retained.

30th.—The vomited matters now are of a bright emerald green, or in colour are not unlike cajeput oil. (R. Creasoti, $\mathfrak{m}$ iij; Syr. Papav., 3ss; e. Mist. Olei Olivæ, 3^{iss} horis si non vometur;) rejected at once. Sumat. post horas duas; (Acid. Hydrocyan. Dil. $\mathfrak{m}$ v; Aquæ Sodæ, 3j, tertiâ horâ.)

31st.—The acid is sometimes retained, but it does not seem to check the vomiting, which is incessant; she keeps a vessel close by her, which is in constant use; it seems extraordinary that she should live.

It is useless to continue the history of this

distressing case; the patient was unable, apparently, to keep more than a teaspoonful of anything on the stomach, and sometimes not even that; at times there would be almost constant vomiting of this greenish matter, for several hours; then a lull and a little sleep; sometimes the stomach was a trifle more quiet, and in this way she dragged on till 10th September, sixteen days namely, when she died; the eyes deep in the sockets, and every thing showing the greatest emaciation.

These cases are not very common, as far as my experience goes. I find but six of them among my notes on cases of cholera; but I imagine, that one reason, why they are not more noted, is, that unless the fever be severe, or there be much vomiting, &c., the case is looked upon, simply as one of cholerine, followed by febrile disturbance, while in reality the disease is cholera. One of these six cases, without a well-marked cold stage, and one, moreover, which recovered, was living in the same room with her mother, who died of cholera. The corpse was still lying in the only chamber they possessed. Eighteen hours after the mother's death the girl was seized with purging, vomiting, &c., which ushered on secondary fever

without previous algide stage ; and in the same house three people, besides this mother and daughter, were ill with cholera algida, of whom two more died.

Of the causes and treatment of this form of fever in cholera more will be said in a future part of this volume. It has only been introduced here to illustrate, as far as possible, my ideas upon the nature of the cold stage of the disease, which, for the want of some other and better mark of distinction, has been erroneously made the line of demarcation between English and Asiatic cholera, and which, according to this view, is only one phase of the Asiatic disease.

Cholera, then, is a malarious disease, of an irregular intermittent type, the cold fit being so violent, as to form the most fatal part of the malady, and to take the most prominent place, in all descriptions, and all our ideas of the disease. With the algide symptoms is combined, more or less, morbid action of the stomach and bowels, which action appears an essential part of the malady, and is seldom absent.

CHAPTER IV.

TREATMENT OF THE ALGIDE STAGE.

It is a matter of no little importance, that we should be able to estimate what proportion the fatal cases of algide cholera bear to the number of recoveries; and a Table (perhaps I ought to say a list) will be given, where this is in some measure shown; but these numbers will not, probably, represent quite a fair proportion of those, which may be saved, because of the great disadvantages which patients brought to an hospital labour under. Thus, in the first place, when the epidemic was at its height, in the months of July, August, and part of September, 1849, the number of applications was so great that none but the very worst and most unpromising cases were, as a rule, admitted. Then many of the unfortunate victims lived at a distance of a mile or more, and thus in a state, when the slightest circumstances, tending to depress the vital powers, should have been carefully avoided, they were placed in a jolting cab in

an upright position, generally at night in the cold, and with clothes huddled hastily on. Thus, if a poor unfortunate were at starting ill enough to be admitted into an hospital, he was at his arrival in a state almost bad enough for the grave. It must, therefore, be expected, that we shall find the mortality table much higher, than it would be, had the same plan of treatment to be adopted, under less disadvantageous circumstances; for nothing could really be worse, than the conditions, under which patients must necessarily be received. Therefore, if, of those admitted in a state of actual collapse, one third are recovered, it is as much as could be hoped for, by the most sanguine, and more than are recovered from an equal degree of prostration, brought about by any other disease whatever. Now, more than a third do recover altogether, and get quite well; of the remainder, a certain number die in the collapse, and a certain proportion live into the consecutive fever, and some few pass thence again into a second algide stage, which is, in my experience, always fatal—at least I have never seen any one recover who had undergone two algide stages; but the sixth case here reported shows, that the patient may live to have a return of incomplete hot stage.

In looking over returns, and endeavouring to find the proportion of deaths to the whole epidemic, it will be found that they vary considerably according as the medical men who make the returns consider cholera algida to embrace cases where the pulse is only weakened and the extremities only are cold. In the following estimate, only those cases are recorded as collapsed algide cholera, where the whole surface and the tongue was cold, and where the pulse was very much weakened, or only just perceptible. Of the different states of pulse in collapse, I make three degrees—viz., imperceptible, just perceptible, and perceptible. No case is regarded as algide cholera unless the tongue and surface be cold, very cold, or icy; and those, whose extremities merely, were cold, were not admitted in the table; the same degrees of comparison are applied also to the breath, and discoloured, blue, and livid to the face. It will not, therefore, be surprising if the annexed table show a very large proportion of deaths, for some of the cases were actually moribund, when admitted, many pulseless. Where nothing with regard to the countenance, purging, or cramp was to be observed, nothing has been written; but when in the tables the word cramp or vomiting appears, it denotes that it

was a prominent and distressful symptom. The table has been prepared with great care, and is believed to be perfectly accurate.

In none of these observations have the words cholera asphytica been used, as a distinguishing mark from cholera enterica, because the terms have always appeared to me, simply applicable to precisely the same disease, in more or less far advanced stages. The cholera enterica is only a stage of diarrhœa, when passing over to cholera, while the stools are still mixed with a little bile, while the skin is not discoloured, and while the surface is cool, or but slightly cold,—a set of symptoms, which may give place in half an hour to those of the so-called asphytic cholera; the difference in the rapidity and violence of the disease does not, by any means, warrant us in forming a specific distinction, and may depend upon a great variety of secondary causes. Thus, though the patient who has been seized with violent diarrhœa, in the way treated of in the last chapter, is, I have no doubt, suffering under the cholera poison, yet, so impossible does it appear, to make a distinct line of separation, between diarrhœa and cholera, that I have not included in my returns any one case, which had not a distinct algide stage or suppression of urine.

It was of course desirable, in order to have a clear view of the comparative efficacy of the various plans of treatment, that their results should be compared with those of other modes, and for this purpose a recent work on Asiatic Cholera was consulted. The tables there printed do not, however, give the symptoms under which the different patients were labouring at the time, and by the author's own account, he and his patients, and everything connected with salt, was involved in so strange an atmosphere of falsification (apparently for some dark purposes of certain eccentric malevolent beings), that it is difficult to draw any conclusion from them whatever; and probably many cases are looked upon as cholera, and malignant cholera, which would not generally be included in that category.

As it is, though salines appear decidedly beneficial, *by their usual mode of action*, in the latter stages of the disease, they have not a powerful, or indeed any effect in the collapsed state; but until some real and accurate observations on the subject be published, it is utterly impossible to draw any conclusion concerning the efficacy or inefficiency of the plan of treatment.

TABLE

Showing the Condition of the Patients and the Results in Ninety Cases of Cholera.

Name.	Description of State.	Died in Collapse.	No. of Hours.	Died in Consecutive Fever.	No. of Days.	Recovered.
M. Kelly	Very cold; pulse perceptible	—	—	1	6	1
William Roberts	Cold; pulse just perceptible; blue	—	—	—	—	1
Northa Bailey	Icy; pulse just perceptible; very blue	1	24	—	—	—
David Chamberlain	Very cold; pulse perceptible; blue	—	—	—	—	—
G. Dullea	Icy; pulse just perceptible; blue	1	9	—	—	—
Philip Bird	Very cold; pulse imperceptible; insensible	1	5½	—	—	—
H. Wilson	Cold; pulse just perceptible; much purging	1	6	—	—	—
G. Dearlin	Very cold; pulse imperceptible; blue	1	5½	—	—	—
Ed. Clemens	Very cold; pulse imperceptible	1	10	—	—	—
J. Clarke	Icy; pulse just perceptible	1	5½	—	—	—
Ed. Cecil	Cold; pulse imperceptible; blue	—	—	—	—	1
Thomas Jones	Cold; pulse just perceptible; discoloured	—	—	1	6	—
Francis Kent	Icy; pulse imperceptible; livid	1	10	—	—	—
W. Nalley	Icy; pulse just perceptible; blue	—	—	1	26	—
Richard Price	Very cold; pulse just perceptible; discoloured	—	—	—	—	1
Francis Murray	Very cold; pulse imperceptible; livid	—	—	—	—	1

J. Hennessey	Two algid stages	1	42
— Maloney	Icy; pulse imperceptible; livid	1	24
Thomas Francis	Cold; pulse perceptible; discoloured	1	—
Henry Hodges	Very cold; pulse imperceptible; livid	1	7½
Charles Finch	Icy; pulse just perceptible; blue	1	10½
John Johnson	Very cold; pulse just perceptible; livid	1	9½
Johanna Hart	Cold; pulse imperceptible; unconscious	1	31
Julia Dacey	Very cold; pulse perceptible; passed much urine	—	—
Mary Dunn	Very cold; pulse just perceptible; blue	—	—
Mary Driscoll	Very cold; pulse imperceptible; blue	—	—
Ann Green	Cold; pulse just perceptible; cramp	1	12
Mary Livingston	Icy; pulse just perceptible; much cramp	1	15
Johanna Connor	Very cold; pulse imperceptible; blue	—	—
Sarah Copeman	Icy; pulse perceptible; not blue	—	—
Sarah Copeman (aiz)	Very cold; pulse just perceptible; thirst	1	11
Honora Brian	Very cold; pulse imperceptible; no vomiting; no purging (cholera sicca)	1	21
William Barlow	Very cold; pulse just perceptible; blue	—	—
James Garally	Icy; pulse imperceptible; livid; unconscious	—	—
Richard Clark	Icy; pulse just perceptible; livid	1	11
C. Ballantine	Very cold; pulse just perceptible; livid	—	—
William Johnson	Cold; pulse perceptible; discoloured	—	—
Stephen Davis	Icy; pulse imperceptible; discoloured (cholera sicca)	—	—
John Edwards	Cold; pulse just perceptible	1	11
John Hobran	Cold; pulse just perceptible; livid; blood	—	—

Name.	Description of State.	Died in Collapse.	No. of Hours.	Died in Consecutive Fever.	No. of Days.	Restored.
William Robinson.	Icy; pulse imperceptible; discoloured	—	—	1	5	—
Thomas Ash	Very cold; pulse just perceptible; blue; twice algide	1	28	—	—	1
Thomas Alder	Cold; pulse perceptible; discoloured	—	—	—	—	—
Charles Wheeler	Icy; pulse imperceptible; stupefied; cannot speak	1	15	—	—	1
William Watson	Cold; pulse just perceptible; voice altered	—	—	—	—	—
Richard Lee	Cold; pulse imperceptible; voice high; discoloured	—	—	—	—	1
Thomas Davis	Icy; pulse imperceptible; livid	1	33	—	—	—
William Sampson	Twice algide	1	—	—	6	—
Maria Henderson	Cold; pulse perceptible; not blue	—	—	—	—	1
Elizabeth Funnell	Very cold; pulse just perceptible; had taken oxalic acid	—	—	—	—	—
Sarah Knox	Very cold; pulse perceptible; livid; shrivelled	—	—	—	—	1
Jane Rainton	Cold; pulse just perceptible; discoloured	—	—	—	—	1
A. Roberts, æt. 3 mo.	Very cold; pulse imperceptible; cramped	1	32	—	—	—
Anna Greenwood	Icy; pulse just perceptible; blue; voice high	—	—	—	—	1
Mary Evans	Icy; pulse imperceptible; livid; shrivelled; twice algide	—	—	—	—	—
Eliza Baldwin	Very cold, clammy; pulse just perceptible; blue	1	29½	1	6	—
William Porter	Cold; pulse just perceptible; vomiting	—	—	—	—	1

Name.	Description of State.	Died in Collapse.	No. of Hours.	Died in Consecutive Fever.	No. of Days.	Recovered.
Ann Ward .	Very cold ; pulse perceptible ; blue	—	—	—	—	1
Makilda Horton .	Icy ; pulse just perceptible ; cramp	1	12	—	—	—
Susan Harbour .	Very cold ; pulse just perceptible ; not conscious	1	22 $\frac{1}{2}$	—	—	—
Catherine Carrol .	Cold ; pulse imperceptible ; very livid	1	4	—	—	—
E. Corcoran (phthisis)	Cold ; pulse perceptible ; discoloured	—	—	1	3	—
Mary Knowles .	Moribund ; comatose	1	10	—	—	—
Sarah Higgins .	Cold ; pulse perceptible ; discoloured	—	—	—	—	1
Ann Strachin .	Icy ; pulse imperceptible ; cramp	—	—	1	7	—
Jane Child .	Very cold ; pulse perceptible ; cramp	—	—	1	9	—
Harriet Norman .	Very cold ; pulse imperceptible ; vomiting	—	—	1	6	—
Total number, 90		41	—	14	—	35

From these Tables we perceive that 41 patients out of 90 died in collapse; of these four were twice algide, one was oppressed with opium, and another had an infusion of tobacco administered to him by a Russian physician, who, at the request of the treasurer, was permitted to try his specific. Thus to obtain a correct estimate of the proportion of those, who passed once through the algide stage, compared to those who succumbed, we should subtract the latter 2 from the number of the dead, leaving 39, then subtract the 4 who were twice algide from that number, and add it to those recovering from one such attack, the ratio then is 35 dying in the cold stage, to 39 who passed through it, which is, it is firmly believed, a larger proportion than recover from so deep a collapse in any other disease whatever.

Now, the treatment to be employed with any patient, who comes under our care in this state, divides itself into two indications, the first, to restore the circulation and warmth, the second, to combat the excessive action of the stomach and bowels. The first mentioned is the most urgent, since the collapse is not caused by the amount of discharges from the intestine, but has, on the contrary, no direct ratio to this amount, since it is by no means uncommon to

find a great degree of prostration, where there is but little vomiting and purging, and even in some cases, where there is none; and again, many patients will suffer much from these causes, and pass through a much milder state of collapse. Therefore the first essential is to recover the circulation, since the derangement thereof will quickly kill; while, when that function is restored, any treatment directed to the purging, will not only be more efficacious, but also, since time for its action has been gained, will have some opportunity of exerting its power. We certainly cannot, on the other hand, expect that any medicine should act, while the patient is sinking lower and lower, while the circulation is so sluggish, that but little absorption can take place, and while, in spite of these difficulties, every remedy, to tell at all, must be of a description so powerful, as to make some decided effect on the system in a very short time. Moreover, as stated elsewhere, it is not improbable, that the disorder of the circulating system, and chiefly the congestion of all internal organs, may be a great cause of the constant watery drainages from the blood; particularly as a restoration of action in the superficial vessels, and consequently a decrease of congestion in the visceral veins,

is very often of itself sufficient to stop the watery dejections, whereas no amount of chalk, astringents, &c., appear to have this effect while the collapsed condition of skin continues.

A very striking circumstance, connected with this particular state, is the very slight degree, in which the brain and nervous power generally are debilitated. Patients will be seen actually walking with a steady gait, while their faces are perfectly blue, and who, when first seen by a medical man, are found to have scarcely any pulse at the wrist. One of the patients (Robinson) in the above list walked from Horsleydown to the Hospital, a distance of about a mile, and when examined, a few minutes after his arrival, was found livid, and all but pulseless. This expenditure of vital energy, however, when all, which the unfortunate possesses, is required to carry him through the disease, is anything but beneficial; and, in our treatment, all possible means should be directed to spare that force as much as possible, that the patient may save his powers to struggle with the disease. In speaking of the treatment of choleraic diarrhœa, the necessity of preserving the horizontal position was insisted on, and in this further advanced stage of the

malady it is even more essential; the exertion of standing, or even of sitting upright, is an expenditure of that force, which we so much wish preserved; besides that, in the upright position gravity aids greatly in augmenting the constant flow of fluids from the bowels.

Stimulants, such as brandy, ammonia, or wine, though decidedly useful in their place, have not such effect in restoring circulation, and exciting the system to greater action, as in collapse from other disease; indeed, considering the difference of its cause in this and in other maladies, it is not to be expected, that they would be as beneficial; for prostration usually occurs in consequence of nervous shock, and consequent loss of nervous power; therefore, stimuli which act upon that system are naturally, in those cases, such as would benefit. But in this disease, there is comparatively little loss of nervous power; in fact, with so great disturbance of the circulation, the retention of nervous power is marvellous. Our remedies ought not, therefore, to be directed through that system, but we should, if possible, find some means of acting on, and recalling the circulation, without exciting the nervous centres; and the best mode of doing this is by external heat.

This principle of combating the deadly cold collapse was not found or recognised at St. Thomas', until after several cases had been treated at the Hospital, and the general inefficacy of medicines or of stimulants proved; and though a certain number, under the treatment, then adopted, recovered, still the whole result was unsatisfactory: thus, of 28 cases of perfect collapse, before external heat was used, but 7 recovered,—a very small proportion; but after this was employed, 61 patients were treated by some mode, in which this formed an essential part, and of these 27 recovered, or not very far from half the whole number,—a proportion which we may call $\frac{9}{20}$ ths of the whole,—the application or non-application of external heat making the difference between the recovery of one quarter, or one half of the whole number of patients.

Many expedients were used in the way of astringents, stimulants, &c., and of these, although unsuccessful, it were as well to give some account; but remarks upon them will not be necessary, as the cases themselves will amply show the deficiency of power in the medicines to procure the desired reaction.

Northa Bailey, æt. 34, sailor, from St. John's,

Newfoundland, who has been in England about three months, appears miserably poor and dirty, admitted 2d March, 1848, 9½ a.m.

He was taken ill last night with vomiting, purging, pain in the bowels, and cramp, and was found by a policeman in the streets, where he had been walking about, or lying down all night.

Has great pain in the bowels, is quite cold, blue, fingers much shrivelled, eyes sunk, voice husky, tongue blue and cold, pulse scarcely to be felt. (D. L., Beef-tea, Oj; Catapl. Sinap. Abdomini. Sp. Æth. Sulph. Co., ʒj; Sp. Ammon. Arom., ʒss; Liq. Opii Purif., ʒss; e Mist. Camph. statim, Soda Water, Brandy, ʒij.)

6 p.m.—Has passed four rice-water dejections; feels sick, but not to vomit; drinks greedily of water; body is warmer, but still blue; has slight cramps; tongue still cold. (Sp. Æth. Sulph. Co., ʒss; Liq. Opii Purif., ℥xx; Conf. Aromat., ʒj, e Mist. Cret. c. Mucil. Acaciæ, ʒss, 3^{ies} horis.)

9 p.m.—No urine; one more dejection of the same character; pulse very small and weak; body not so cold, as the face and tongue, which are quite icy; breath cold; great thirst. (Enema Dec. Avenæ c. Ol. Olivæ, ʒvj, stat.)

3d, 3½ a.m.—Sinking rapidly. Sumat brandy, ʒij. Died on the 3d, 9½ a.m.

David Chamberlain, æt. 30, paper-maker, admitted 24th May, 1849, 11 a.m.

Has been ill six days with purging, and sometimes vomiting, but was seized this morning with more violent sickness, purging, griping, and cramp.

11 a.m.—A good deal of cramp, surface very cold, tongue cool, countenance anxious, skin blue, voice choleraic, eye sunk; pulse 96, rather weak; tongue brown and dry. (D. L., Beef-tea, Oj; Catapl. Sinapis Ampl. Abdomini, Hydr. Chlorid., gr. v; Opii, gr. j, stat.; Mist. Cretæ Co. post sing. sed. liquid.)

10 p.m.—He is quite warm, the cramps have disappeared; has passed one motion shortly after coming in; has passed urine; pulse 84, stronger.

25th.—No motion since noon yesterday; no pain, and appears well, but rather weak. (Brandy, ʒj; Ol. Ricini, ʒss, cras mane sumend. si alvus non movetur.)

He got well quickly, and went out on the 30th.

Philip Bird, æt. 16, sailor, Ipswich, admitted 12th of July, 1849, 9 p.m. Brought up from

Nine Elms; purged with vomiting all day, but whether suffering from previous diarrhœa, or not, cannot be discovered. He is now insensible; skin, tongue, and breath icy; surface blue; hands shrivelled and much cramped. (D. L., Beef-tea; Catapl. Sinap. Abdomini, Brandy, ℥iv; Æther Chloric, ℥x, Liq. Opii Purif., ℥xx; Conf. Aromat. ʒj; e Mist. Cretæ Co. 2^{dis} horis; Enema Ol. Olivæ, ℥vj, statim.)

12 p.m.—Has passed no motion nor urine; has come a little to himself, and constantly begs for water; cramps very violent; surface, &c. as cold as before; pulse hardly perceptible; respiration short, 30 in the minute.

2½ p.m.—Sunk, and died comatose.

Jeremiah Dullea, æt. 40, cadger, Mint, Borough, admitted July 12th, 1849, 4 a.m. His friends do not know, whether he has been lately suffering from diarrhœa, and a distinct answer is not to be obtained from the patient. However, he was seized at 2 a.m. with violent purging and gripes.

Surface, tongue, and breath cold; pulse about 112, small, just perceptible; cramp violent; rice-water evacuations; skin blue, and shrivelled. (D. L., Emp. Sinap. Amp. Abdomini, Sp. Ammon. Arom., ʒj; Liq. Opii Pur. ʒss; Conf.

Aromat., ʒj; Spt. Æth. Sulph. Co., ʒj; e Mist. Cretæ Co. 2^{dis} horis; Brandy ʒss, pro re natâ.

9 a.m.—Bowels moved seven times; no urine; suffers a great deal from cramp; skin deathly cold; pulse just perceptible.

11 a.m.—Bowels have not since been moved; he is quite unconscious, therefore cramps do not take the same effect, but there is a strange subcutaneous writhing movement among the muscles of the arms and chest.

1 p.m.—Died; still unconscious, 9 hours after admission, 11 after the attack.

These four patients are all treated on the same idea, namely, that of stopping the action from the bowels; but in these cases the ordinary means for restraining diarrhoea are found unsuccessful. The astringents Catechu and Kino, for instance, run off frequently by the bowel, only colouring the evacuation, while chalk mixture often does the same; and how irritating it must be to so delicate a structure to have such sharp materials, like a solution of sand-paper, coursing through it; and even if it do not run through, the propriety of clogging a man's bowels with heaps of lime, may perhaps be doubted. It appears strange, that so much attention should be devoted to this particular object,

when the alleviation of the great prostration and collapse is decidedly the first and most urgent indication;—when the patient is blue, cold as ice, and all but pulseless, it is certain, that of all things, it first is necessary to restore the natural condition; but that this can be done by the administration of catechu, chalk, &c., is not very probable. No reliance can be placed on these remedies for the cure of cholera, not but that some cases do, under this plan of treatment, combined with rest, recover; but the “*post hoc*” must not be confounded with the “*propter hoc*,” and probably more people do not recover with this sort of treatment, than if they were let alone. These remarks only refer, however, to the true algide stage of cholera, for in the premonitory or choleraic diarrhoea the use of astringents, &c. has, in the foregoing chapter, been recommended, and their efficacy insisted on.

When most remedies employed had been found of little efficacy in combating the disease, and when many, that previous to the invasion, had been quite petted and eulogised by different doctors, as all but infallible, had been discovered to be perfectly useless, people began to look about them for other means, and many different methods were attempted, and many remedies administered, merely because they were new,

and had not been tried before, while others were taken into trial upon the recommendation of continental physicians. Thus Mercury, in large and small doses; Opium, in different ways; Brandy; Emetics; Salines; Chloroform; Turpentine and Olive Oil, both by the mouth and in enema; Tobacco; injecting the veins, &c., were all tried, and without the successful issue that their various English, Continental, or Indian advocates had promised; sometimes, it is true, in the hands of one or two practitioners, two or three cases would consecutively recover, and then the plan was vaunted and the medicine strongly recommended by a letter in the 'Lancet' or 'Times;' but in a little while the new remedy was perhaps condemned with the rest, and it was found that a fortuitous run of recovering cases had given the medicine a lustre as false as evanescent.*

* Even lately, (Sept. 16th,) a letter has appeared in the 'Times,' strongly recommending the use of chloroform in cholera; now although the patient to whom the writer administered that agent died, still a certain remission of his symptoms, and more particularly of cramp, appear to have given hopes of the efficacy of the inhalation. The surgeon very truly says that the patient dies of exhaustion, produced by the specific poison of cholera, and argues that chloroform gives rest, and so prevents the exhaustion; but the prostration of cholera is not produced by excitement, pain, or nervous exhaustion, the nervous system is, indeed, but slightly affected. The cramp, which all who see the agony

Here subjoined are a few cases, which will show the effects of some of the remedies thus tried, and then justly abandoned. We will then pass on at once to consider that plan of treatment, which appears to me, according to the morbid anatomy and pathology of the disease, and according to its successful issue, to be the best and most efficacious yet discovered.

Wm. Nalley, æt. 28, removed to Clinical from Jacob's ward, 18th July, 1849, at 5 p.m. He had been a month under treatment for rheumatism, endocarditis, and bronchitis. Was taken this morning, at 7 a.m., with vomiting, purging, and cramp, which continued, and he became choleraic.

5 p.m.—Extremities, tongue, and breath cold; surface blue, and hands shrivelled; voice husky; pulse scarcely perceptible; there is constant vomiting, purging, and cramp; (D. L.,

of the sufferers must be anxious to relieve, depends not primarily upon nervous disturbance, but upon irregularities of the circulation, and are better relieved by a remedy, which attacks the real cause of the symptom, than by one which, like chloroform, merely renders the patient insensible to it. All remedies, moreover, which tend further to disturb, and to depress the circulation, and which add to the tendency to congestion, must be injurious; moreover the cramp may generally be alleviated by other means, not only otherwise harmless, but actually beneficial.

Beef-tea, Brandy, $\bar{3}$ ss, quâque horâ; Spt. Ammon. Arom. et Syr. Papav., $\bar{3}$ j; Pulv. Cret. Co. c. Opii, $\bar{2}$ j; ex Aquâ Menth. Pip. post sing. sed. liquid.; Ol. Terebinth. et Ol. Olivæ, aa $\bar{3}$ ss, statim et omni horâ.)

11 p.m.—Still in the same state; vomits and purges rather less; but the surface is as cold, and the pulse as low, as before; no urine.

19th, 8 a.m.—Unconscious; cold; pulseless.

9 a.m. — Died. — N.B. Immediately after death a large quantity of urine flowed from the bladder, as in two other cases.

George Dearling, æt. 60, ostler, Crosby-row, King-street, Borough, intemperate, admitted 14th July, 1849, at 11 a.m.

Has been ill six days with diarrhœa and cramps every night, but has not applied for advice.

5 a.m.—The cramps became violent; general vomiting and active purging set in; passed urine last night, but not since.

11 a.m.—Surface cold and blue; fingers rather shrivelled; eyes sunken; voice hoarse and whispering; tongue dry, cold, and coated; pulse imperceptible; (D. L., Arrow-root; Strong Beef-tea; Cat. Sinapis Amp. Epigastrio; Ol. Terebinth., $\bar{3}$ ss, statim; Ol.

Terebinth., Ol. Olivæ, aa ʒss; Spt. Menth. Pip., statim.)

2 p.m.—Tongue colder; breath quite cold; skin more shrivelled and dusky; tosses restlessly about in bed, and complains of oppressed breathing; respiration frequent; abdomen tender (upper part); no urine; evacuations rice-water, with shreds; (Empl. Canth. Epigastrio; rept. Olei, 4^{tis} horis.)

4 p.m.—Insensible; cold; pulseless; moribund.
Half-past 4.—Died.

Thomas Nixon, æt. 10, Mount-street, Borough, admitted 19th July, 1849, into Isaac's ward for synovitis, and previous to his admission had taken opening medicine. At 11 p.m. seized with purging and sickness, and passed several motions, the last (8½ a.m.) rice water. At 9½ removed to Clinical ward.

18th, 10 a.m.—Extremities rather cold; pulse small, weak; tongue warm; incessant thirst and craving for cold water, which is instantly vomited. (D.L., Beef-tea, Arrow-root, Brandy, and Iced Water; Ice. Emp. Sinapis Abdomini; Brandy or Wine every hour.)

10 p.m.—Extremities warmer; thirst continues; has passed no urine nor motion; pulse a little stronger; vomiting rather less.

19th, 10 a.m.—Surface not so warm; pulse gone down again; three evacuations in the night, and frequent vomiting; no urine; countenance anxious. (Catapl. Sinapis Abdomini; Calves-foot jelly.)

10 p.m.—The raging thirst still continues; tongue coated, dry; frequent vomiting; pulse weaker; surface much the same; eyes more sunk; no urine.

20th, 10 a.m.—Thirst continued till late in the night, when he suddenly refused all drinks; is weaker and cold; pulse just perceptible; voice hoarse; no urine was drawn off by catheter.

1½ p.m.—Died.

Edwin Cecil, æt. 18, Essex-court, Borough Market, admitted July 18th, 1849, 7½ p.m. The parents are very poor, and appear recently to have been turned out of their lodging for rent. This poor lad has had but little food lately, and has been eating raw refuse vegetables in the Borough Market; says that he was taken ill yesterday morning, about nine o'clock, with purging, and about three hours since with sickness; he has continued vomiting nearly ever since; has had cramps in the calfs of his legs; passed urine last night.

7½ a.m.—Extremities cold and shrivelled; tongue cold; countenance blue; pulse scarcely perceptible, eyes hollow. (D. L., Beef-tea, Brandy, Iced Water. Empl. Sinapis Abdomini.)

2 p.m.—Has passed three copious rice-water motions; no urine; pulse improved a little, and surface rather warmer; no vomiting. (Brandy or wine pure occasionally.)

10 p.m.—Still improving. Tongue quite warm, surface warmer; pulse 90, with more power; no urine.

19th.—Better surface, and tongue quite warm; says he is hungry; no urine has been passed. (Jelly.)

20th.—This morning he got out of bed, and passed rather more than half a pint of dark-coloured urine.

27th.—Convalescent.

Francis Kent, æt. 30; 7, Maze, one of Barclay's bargemen, admitted 18th of July, 4 p.m. Has complained of slight pain in his stomach, all the morning, but went on with his work till 1½ p.m., when he was suddenly seized with violent purging, vomiting, and cramp in the legs and hands, so bad, that he had to be carried from the barge.

4 p.m.—Vomiting constantly; is unconscious

when spoken to; the whole surface of the tongue, and the breath are cold; face and hands blue and shrivelled; has passed a rice-water evacuation, while being actually lifted into bed; all but pulseless. (D. L. Beef-tea, Arrow-root, Brandy, $\bar{3}j$; Ice; Iced-water.)

12 nocte.—Cold; pulseless and unconscious—no hope.

Died 2 a.m.

Now the chief point, which strikes us in all these plans of treatment, is the general want of success, which, however well the medicines may be adapted for the suppression of diarrhœa, or for counteracting nervous exhaustion, is only what we should expect, for when we recollect, that the circulation is almost checked, and that the blood is gathered in the interior, it is hardly to be imagined, that mere alvine astringents should change this state of things; and as we have seen, that there is sufficient power of action in the heart, but not a proper material for it to act on, we can hardly hope to restore the circulation by stimuli, and such medicines as are adapted to nervous depression or exhaustion. What we require is a remedy, which shall act on the circulation, but not through the nervous system, since, as we have seen, the failure is not

in the heart, nor in its innervation; one which shall, by attracting the blood to the surface, unload the great internal vessels, and enable the heart duly and fairly to act. These remedies must be external, since we possess no internal medicines, which act thus primarily on the circulation, and that, which is most efficacious is, we believe, external warmth, or rather heat.

One means of applying this is the hot-air bath, thus constructed:—a case composed of hoops, like the cradle used to lift and support the bedclothes away from a wounded limb, is closed at one end by a light wooden wall, having a small hole through it, for the introduction of a tube, the rest is covered by Mackintosh cloth, except the opposite end, where the material, divided down the middle, hangs loosely, like curtains. This case, which must be large enough to enclose, not only the patient lying on his bed, but a free space of a foot all round him, communicates, by means of India-rubber pipe, with a gas-stove, from which heated air constantly passes into the cradle through the opening in the boarded end; while the curtain-like appendages falling closely round the patient's neck, exclude the head from the heated atmosphere. A thermometer, suspended from one of the hoops, hangs between the two curtains, and enables

the superintendent exactly to regulate the temperature, which can be raised, and is required, very high indeed, often to 180° of Reaumur's thermometer ; and the patient may be left in it for a period varying from twenty minutes to half an hour.

The heat thus applied is, however, very dry, and excites a vast amount of perspiration, which of course evaporates, at first at least, so rapidly, that a question might well arise, whether a sort of cold were not thus produced. While the patient was in the bath, either no attempt at rallying ensued, (but for this he must either be in very great collapse, or of a great age and enfeebled constitution,) or, which was more generally the case, the pulse rose somewhat, the breathing became deeper and often a little hurried, he complained of oppression and weight, the cramps lessened, and there appeared decided improvement. After the application he, however, in too many cases, retrograded rapidly into collapse, so that another method for the application of heat was, after a time, generally adopted.

The hot-wet-sheet, one of the most powerful instruments for imparting warmth that can be imagined, was frequently very successful in dispelling the collapse, and was so grateful to

the patient, that they always spoke of it with thankful expressions. All the world knows that a sheet dipped in cold water and wrapped round the body soon causes great warmth; and this is even the case with a cholera patient, although his body may appear to have lost all power of generating heat; but the *hot* wet-sheet is better, as it brings at once the requisite warmth. The water, out of which the sheet is wrung, should be boiling, and therefore some implement for wringing it without scalding the hands is required. A strong piece of canvass, half a yard broad and rather more than one yard long, has, sewn across at each of its ends, a strong staff, which projects at either side beyond the canvass. The sheet is placed on this, in a bucket, and boiling water poured on to saturation, then two persons turn the stick, one one way, one the other, till the canvass, being tightly twisted, squeezes the sheet sufficiently dry. The patient having been stripped, is now wrapped in this, laid on a bed or mattress, and covered closely with five or six thick blankets, and in this he is kept for one hour.

For this mode, except in certain cases, the hot-air bath was in time entirely abandoned; for in spite of the great temperature, to which the air was raised, the patient did not rally, so

much under its use, as was the case with the sheet, nor was the benefit so lasting. One of the most marked effects of the hot-sheet is the disappearance of cramp. Patients will come suffering from these in a very distressful manner, and after having been in the sheet for ten minutes or a quarter of an hour, will be perfectly relieved; the body, which before was cold, will often come out glowing and red; the tongue, too, is often warmed. Now, during the application of this remedy, the face and tongue are the only means of judging if it be as beneficial, as can be wished, since the hands and wrists are enclosed; the cheeks will sometimes be found to become warm in about a quarter of an hour, and the face loses its choleraic aspect in about half an hour; if these changes take place, and the tongue also become warm, we may be tolerably confident that the patient will live through the stage of collapse, and that time will be allowed for the application of other remedies,—always a great point gained. Another occasional consequence of this external warmth is the checking of the rice-water purging; true, I have never tried this remedy alone to the exclusion of internal ones, such as brandy and wine, and therefore it cannot be directly proved, that the wet sheet, and not the other

means, stopped the intestinal action; but, as many patients have, after the application, never had another rice-water dejection, although before this, they occurred every ten or twenty minutes, and as in this time, he had only taken one dose of medicine, wine, or brandy, it seems fair to conclude that the external warmth, whose action is immediate, was the cause of this sudden check to the morbid action of the intestines, particularly, as the same internal means had before been so eminently unsuccessful, while warmth to the surface was neglected. One of the worst cases of collapse I ever saw, with constant purging, was also a case of the most rapid recovery, and the patient never had a drop of medicine of any description, while in the hospital. The patient seemed afterwards to look upon that hour in the sheet with a mystic veneration, as though there were something magical in the whole performance.

J. Garratty, æt. 57, dustman, Blackfriars-road, admitted August 2d, 8 p.m.—Is not able to speak, all but unconscious; rice-water purging goes on constantly, even while he is stripped. The surface generally blue, the countenance more so, than in any case yet admitted; he suffers from violent cramps; body quite cold; the skin

pinched into a fold retains that shape; tongue and breath cold; vomiting; pulse just perceptible for a beat or two, then disappears, then returns again. (Hot-wet-sheet for one hour, Brandy, Wine.) He had been only about a quarter of an hour in the sheet, when the cramps ceased; passed one motion in the sheet, and one after the full time when in bed.

9 $\frac{1}{2}$ p.m.—Surface warm; cramps ceased; countenance nearly of the natural hue; tongue and breath warmer; pulse 96, feeble and tolerably steady.

3d, 8 a.m.—Leaning upon his elbow in bed, complains of soreness about the abdomen, and says he feels weak. Pulse 85, a little more power. No urine since admission, and no motion after 8 $\frac{1}{2}$ last night.

8 p.m.—Takes beef-tea in small quantities at a time, since but little is allowed him; he has vomited twice to-day, and has passed no motion nor urine. Pulse 110.

4th, 9 a.m.—He passed this morning about an ounce and a half of turbid urine, containing albumen. Pulse 110, rather hard and large.

This patient, who presented a frightful aspect, when admitted, and was deeply collapsed, passed into that stage of cholera, which

will subsequently come under consideration, and was discharged well in about a fortnight. The effects of the plan upon this, the first patient on whom it was tried, were so encouraging, as to lead to its general adoption in the collapsed state. Another case is quoted, where the treatment was equally successful, though hardly as strikingly so; since the skin was not in so cold, nor contracted a condition, as in the former.

Wm. Barlow, æt. 34, carman, Horsleydown, admitted 1st August, 1849, 10 $\frac{1}{4}$ p.m., he has lately lost his wife and two children from cholera. Was taken this evening, 4 p.m., with vomiting, purging and cramp, (bowels out of order for five days), which increased in spite of medicine.

10 $\frac{1}{4}$ p.m.—Face blue and cold; fingers shrivelled, tongue cold; much cramp; pulse hardly perceptible. (Hot-wet-sheet,—Catapl. Sinapis Epigastrio. Hydr. Submur., gr. v., stat. Sp. Æth. Sulph. Co., ʒj; Tinct. Opii, ʒss; stat. et repet. si opus sit. Pulv. Cretæ. c. Opio, ʒj; post sing. sed. liq.) After he had been one hour in the hot sheet, the face had returned to nearly its natural hue, pulse regular and stronger, cramps disappeared.

2d, 8 a.m.—Was purged twice in the night,

rice water; surface warm; pulse 88, regular, feeble; tongue coated; feels sick but not to vomit. No urine.

10 p.m.—Has had during the day three motions, slightly tinged; feels very weak, but is still quite warm, and pulse improves. About two ounces of urine have been passed.

3d, 8 a.m.—One liquid, but coloured motion in the night; passed about half a pint of urine; tongue cleaner.

This patient also lived to the next stage, and ultimately recovered. In this case, the fact, that warmth applied to the surface stops the diarrhoea, tends to favour the hypothesis formerly stated, that one cause of the rice-water purging is the congestion of the vessels in the interior of the body; for when, by the warmth, the blood is recalled to the superficial vessels, and the congestion removed, then does the purging also cease, the vomiting frequently is stopped, and the patient is convalescent, almost from the moment that he underwent this plan of treatment. Such success, however, does not always, or indeed usually, attend any one effort to subdue the disease, but, on the other hand, although the prostration may pass off, the purging and the vomiting, more especially, may continue,

and become a source of continued sinking, and ultimately of death. This purging, in the first place, is frequently to be checked by such means, as is recommended in the chapter on choleraic diarrhœa, by mustard poultices on the abdomen, starch and opium enemata of very small bulk, but when this continues, and is accompanied by vomiting, another mode of practice must be adopted.

Now, this vomiting is frequently most constant, most distressing ; it sets in early in the complaint, and may continue for days, to its very termination, giving the unfortunate patient scarce any interval of rest, preventing his taking any nourishment, and scarcely allowing him to sleep, so that any one watching the case, only wonders, that it does not sooner terminate, and that life can hold out against the constant unrest and exhaustion, which this occasions. The matters vomited are, at first, usually dark, containing much acrid bile ; as the case advances, these become less dark, usually clear, with a yellowish or brown tinge, which gradually passes to a bright green. During the algide stage, the alteration of the voice is often strongly marked, in the retching, for it becomes high and screaming, like a half-suppressed, guttural shriek.

Combined with this symptom, there is frequently urgent, and distressing thirst, the patient is constantly begging for water, of which he swallows greedily a large quantity, and then immediately throws it up again, with but very slight apparent effort, drinks again, and so on. This sort of vomiting does not appear painful, as in the later stages of the disease, but it exhausts the patient, prevents his taking any nourishment, keeps up an irritable state of the stomach, and is sure to lead to that latter stage of vomiting, which is scarcely to be checked, and which continuing, ultimately causes death. It is, therefore, most important that this state should be well and carefully managed, for the most effectual treatment is, in reality, by *management*, more than by medicines. Mustard poultices will have been applied to the epigastrium, and the skin is therefore in a state, which precludes any hope of benefit from further counter-irritation; medicines will do no good, if the patient be allowed, as he will desire, to gulp down large draughts of water, but he must be restrained and watched, that this may not be the case. Everything he drinks should be cold, iced, and in the smallest quantities at a time. Two table-spoonfuls of iced water at a time, is enough for ten minutes, and then another such

quantity, or rather a fragment of clear ice, about as big as a hazel-nut, may be given, and in two minutes more, another such piece; when the patient, as he soon will do, finds the value of pursuing this plan, that thereby, he is not made sick, and that his thirst is much better relieved, he will be content to continue the same method of his own accord. Thus he may have a teaspoonful of brandy, and half a wine-glassful of soda-water every five or ten minutes, or, which is sometimes useful, ten minims of laudanum in the same quantity of soda-water, either with or without brandy, as best may suit the stomach. Hydrocyanic acid is not generally of much benefit in this form of vomiting; but still should be tried with small quantities of soda-water; and creasote generally fails. Combined with the plan of management, however, a pill of four grains of calomel, or of the chalk and mercury, with one grain of opium, often appears beneficial; but, after all, the sheet anchor is the internal cold, the small, but frequently renewed blocks of ice, and the very small bulk of all ingesta. The great benefit derived from internal cold in this complaint, is, indeed, what we should expect, if we admit, that it is this congested condition of the internal parts, which is, in a great measure, the originator of the

stomacho-intestinal disturbance, when ice applied as directly as possible to the viscera, would be just the best adapted remedy for that particular state.

There is, however, a mode of using the mineral acids, which often has a marked effect, in checking both the purging and the vomiting, whether chiefly by their constringent or by their antiseptic qualities cannot be determined, though both have probably their share in the result. This acid is a mixture of the strong nitric and hydrochloric acids, three drachms of the former to five of the latter. On mixing, a quantity of chlorine is set free, and detained in the fluid, and it may be partially to this chlorine that the medicine owes its efficacy.* The dose is eight minims, and it is given with one drachm of syrup of poppies, and with one ounce of water. This medicine is to be administered, as soon as the patient is wrapped in the wet sheet, and continued every hour, it often has the effect, combined with the management above de-

* While these sheets were passing through the press, a letter from Dr. Herapath appeared in the 'Times,' in which that eminent chemist recorded the analysis of an Austrian cholera specific, much prized in that country. The remedy contained Sulphuric and Hydrochloric Acid, with Gum and Sugar, a combination, which, if nitric be substituted for sulphuric acid, is apparently much the same, as the composition of the remedy here recommended.

scribed, of checking the vomiting and purging, and even, where the absence of algide symptoms rendered the use of the hot sheet unnecessary, this acid was often found to be thus beneficial, and was often given to the exclusion of all other medicines whatever. Great dependence, therefore, may be placed on this combination for subduing the vomiting, if it be administered early enough in the disease, and it has the same effect upon the purging, five doses being sometimes sufficient to put an entire stop to both symptoms. When all these remedies and the management of the ice and cold drinks fail, as they sometimes will, the vomiting runs on to another, and even more distressing, stage, which will be hereafter shortly described. One circumstance should not, however, go unnoticed, viz., the desirability, when opium in the solid form is to be administered, of giving, not the soap and opium, but simply crude opium, since the soap certainly appears to induce vomiting in this particularly irritable state of the stomach. And here it may be advisable to say a few words with regard to the use and abuse of opium in this disease. As a remedy for choleraic diarrhœa this medicine, combined with stimulating astringents, is, as has been said, extremely useful, when given in moderation;

but it is vain, and indeed injurious, to attempt to cut short the disease, entirely by its means; there is, in the collapsed, and in the subsequent stages of cholera, a tendency to apathy and to heavy sleep, almost amounting to stupor, which this remedy only increases, and it, moreover, when given in excess, masks the nervous symptoms and perplexes the treatment. In the collapsed stage of cholera, while the patient is actually cold, almost pulseless, and when one sound of the heart is already lost, the medicine can only be hurtful; and, as far as my experience goes, does not subdue cramp, even when given in quantities sufficient to produce most decided and injurious effects on the nervous system. One patient, a captain of a small trader, had taken, I believe from the medicine chest of his vessel, so large a quantity of opium, that it was impossible to say, whether he died of the remedy, or the disease, and yet, for the short time, during which he lived under our observation, cramps in the calf of the legs were continual, the only sign of suffering being referable to that cause.

After the collapse has entirely subsided, a small dose of opium, in the solid form and crude, has *sometimes*, however, a beneficial effect in checking the remaining disposition to vomit and to purging, and in subduing a restless state of

the patient, which is occasionally present, and during which he often rolls himself about, throws off the bedclothes, and exposes his body to the cold air, which has, as before said, a most injurious effect. Laudanum is also useful in the same way, but more so as a remedy for purging, than for vomiting, since a pill is often retained, and allowed to act when fluids are rejected; it should be given in a small quantity of soda-water, if there be vomiting, and if, as is sometimes the case, it excite this action, either solid opium may be substituted, or another remedy tried. The drug, however, can only be recommended in a few instances, when the collapse, passing away, leaves the patient fretful and restless, but without the pulse becoming hard, or the skin hot, and when there is no fulness of head.

A few cases now follow, which in part exemplify the effects of the different plans here inculcated.

Charles Ballantine, æt. 49, bell-hanger, admitted August 4th, 1853, 10 a.m.—Has had diarrhœa some days; but has paid no attention to it, as there was no pain; this morning, however, 5 a.m., he was taken with violent purging, vomiting, and cramp, which continued and became worse, so that he was conveyed to the hospital.

10 a.m.—The surface, tongue, and breath are very cold, the face livid and eyes sunken, the pulse scarcely to be felt, voice husky and suppressed. (D. L., Beef-tea; Hot-wet-sheet; Acid. Nitr. Muriat., mviij ; Syr. Papaveris, ʒj ; Inf. Catechu, ʒij ; 2^{dis} horis.)

9 p.m.—While he was in the hot sheet the cramps ceased, and the face and breath became warmer; in two hours the purging was less urgent, but the vomiting did not seem much altered, the pulse stronger. (Sumat. Hydrarg. Chlorid., gr. ij ; Opii (crude), gr. j ; statim. Catapl. Sinapis Abdomini applicand.) Ice was given in small quantities, also soda-water. The vomiting decreased, the purging has almost ceased. (Sumat. Mist. 4^{tis} horis.)

August 5th, 10 a.m.—Passed two slightly-coloured motions in the night; has had no return of vomiting; but has passed no water since his admission. Tongue slightly coated, white. Pulse 86, weak.

6th, 10 a.m.—Has had one coloured and consistent motion since the last report, and passed last night a little high-coloured, turbid urine; this morning again about half a pint more. He may now be considered as out of danger, for though there is a little feverishness,

this is but very slight, and will be, evidently, very transitory.

Richard Lee, æt. 40, servant, admitted Aug. 23d, 1849, 9 $\frac{3}{4}$ p.m. — Was well up to this morning, but has felt ill and out of sorts all day; within the last half hour he has been seized with violent purging, vomiting, and cramps. The attack was so severe, that he appears partly to have lost consciousness, for he was found on the pavement near Southwark Bridge, and brought straight to the hospital.

Surface and tongue cold; pulse imperceptible; skin blue; eyes sunken; voice choleraic. Suffers very much from cramp, and has vomited two or three times while being undressed. (D. L., Beef-tea, Arrow-root, Hot-wet-sheet, Mist. Acid. Nit.-Mur. omni horâ. Cat. Sinapis Epigastrio.)

11 p.m. — He is now hot, and in a very profuse perspiration; has no cramp, tongue hot, has vomited once, while in the sheet; the mustard poultice will now be applied. Pulse 96, stronger.

24th, 10 a.m. — Has had no motion since his admission, nor has he vomited since the last report; has not passed urine; pulse 88, stronger; tongue white.

10 p.m. — Has passed about a pint and a half of urine.

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TREATMENT OF THE ALGIDE STAGE. 127

25th.—Has had no motion since admission. (Hydr. Chlor., gr. v; Opii, gr. ss, statim; Ol. Ricini, post horas tres.)

26th.—The oil has acted sufficiently, the motion being natural. This patient had but very slight fever, and was discharged well on the 28th.

The former of these two is a case, where some of the management spoken of above had carefully to be employed, and in which this was successful. The latter shows the rapid improvement sometimes following the application of external heat, and the administration of the acid, particularly when the case has been seen sufficiently early; the diminution of the cramps, the cessation of the purging immediately after the application of the wet-sheet, the effect of counter-irritation on the vomiting, all show the power of these external means, and that we are not justified in looking upon them, as of slight moment in the treatment of cholera.

When the sickness cannot be stopped, it runs into a sort of persistent impatience of every species of food and drink, it is very frequent, and exhausts the patient excessively; the retching becomes habitual and painful; the mouth and throat are excoriated by the acrid fluids

ejected; the eyes become deeply sunk, or rather buried in their orbits, while the lids and skin around assume a dark bluish or brown colour; the alæ of the nose fall in; the lips are kept open and contracted against the gums, throwing the skin into thin transverse folds; the teeth become very dark; the face very pale and emaciated; the patient altogether presenting the most deathly aspect for anything still alive, that it is possible to imagine. Of these, the case of E. M., given at page 79, was one of the most painful. The girl was patient and quite uncomplaining, going through the most dreadful sufferings without a murmur; she was so grateful to the nurses, or other patients, for the slightest assistance, that she was affectionately regarded by all in the same ward, by sister, nurses and fellow-sufferers. All attempts to save her life were vain, she became thinner, weaker, and at last died, looking less like a corpse when dead, than she had looked three days before, while living. The next case is another example of this inveterate vomiting.

John Cronin, æt. 22, labourer, has been for nearly six months in Abraham's Ward. He was taken ill August 29th, at about eight o'clock, with purging, and was ordered chalk

powder, with opium and catechu. About two hours after, when seen again, he was worse, with more purging and with vomiting, but without pain. (Ordered Calomel, gr. v; Opii (crude), gr. j, statim.)

August 30th, 7½ a.m.—The purging and vomiting have continued ever since; the vomiting, more especially, has been very violent, and continues so; he has had no cramps. Removed to the Cholera ward. He is now very pale, with sunken and choleraic countenance; surface and tongue cold; skin covered with clammy perspiration; constant vomiting; appears stupefied. (D. L., Beef-tea, Arrow-root; Hot-wet-sheet immediately; Hydr. Chlorid., gr. j, 6th horâ quâque parte; Tinct. Opii, m vij, ex Aquæ Sodæ ʒss post pulvere sumend.)

10 a.m.—Vomiting a little less, but he is almost unconscious, passing his motions in the bed; pulse more feeble. The hot sheet seemed at first to restore him, but he has not continued to rally, as at first expected.

10 p.m.—The vomiting has returned. To leave off the powder for two hours, and then to take the acid mixture every hour. Purging also continues; seems less insensible; very intense thirst.

31st, 10 a.m.—Vomiting much the same;

he is allowed only a little to drink at a time—an ounce of soda water with one teaspoonful of brandy—and has small blocks of ice; but the thirst is so intense that it is very difficult to keep him to this regulation. He is constantly calling for drinks in a wild, almost fierce tone; but he vomits if he takes more than one or two tablespoonfuls. Purging less; eyes suffused, chemosis of the right conjunctiva from constant retching; pulse very feeble; abdomen distended.

10 p.m.—At 12 p.m. he was ordered *Acidi Hydrocyan. Dil.*, mj (Scheele's); *Chloroform*, mx , *ex aquâ*, fss . The draught acted more rapidly than an emetic. Let him have *Tinct. Opii*, mvj , *ex Aquæ Sodæ*, fss , *omni semihorâ*. Let the soda water be well iced.

September 1st, 10 a.m.—Vomiting rather less, and purging much the same; still can take no nourishment; pulse a little better; there is some tenderness at the epigastrium. (*Tinct. Opii*, zj ; *Infus. Catechu*, zj ; *M. ft. Enema*, 4^{tis} *horis utend.*; *Catapl. Sinapis Abdomini*.)

10 p.m.—Purging is less, vomiting has rather increased; the matters ejected are now of a green colour, like cajeput oil. (*Sumat. Sodæ Sesquicarb.*, *gr.* ij ; *Acidi Hydrocyan. Dil.*, mij , *ex Aquæ Sodæ*, fj , *omni horâ*.)

2d, 10 a.m.—Just the same; nothing appears to remain on the stomach, no medicines to check the vomiting; a stimulant was tried (Ammon. Sesquicarb., gr. v; Tinct. Opii, $\mathfrak{m}$ x, ex Aquâ, $\mathfrak{z}$ j, statim.); it was retained a little time, and then thrown up; bowels quiet.

10 p.m.—Let him have small lumps of ice about as big as an almond; some of these he may swallow, some allow to dissolve; Brandy, q. s.

3d, 10 a.m.—He has retained the ice and brandy; has passed water, and slept better than since he came in.

It will, however, be useless to follow this report further. The vomiting decreased, only for a time; the patient fell into consecutive fever, which, in the weak state to which he was reduced, combined with more or less constant vomiting, carried him off in twelve days after admission.

It will be perceived, that in this case a mode of giving mercury was employed on which a few words will be necessary. Unfortunately, for the strict validity of any conclusions to be drawn from its results, it was not tried till late in the epidemic, when the cases began to

assume a somewhat milder form; but the following appears the true valuation of the remedy. In the first place, it cannot, in cases of true algide cholera, particularly when the collapse is deep, take the place of external warmth; but, combined with this, it is a good remedy in cases, where vomiting is not a prominent symptom. It first tends to diminish the purging, and procures, more rapidly, than other medicines, an admixture of bile in the motions; it then salivates, and probably diminishes the intensity of the after-stages,—probably, I say, because, in the latter part of the epidemic, these after-stages may of themselves be milder than during the heat and violence of the attack.

Thus the remedy, in cases where vomiting is urgent, should rather be the acids than the mercury; they appear also in children more suitable, and most decidedly so in those cases, where there is bleeding from the bowel; also where the skin is very blue and inelastic. On the other hand, when the algide symptoms are less marked in the condition of the skin; but where the dejections are frequent, copious, and mixed with fewer shreds in proportion to the amount than usual, the small, very frequent doses of calomel and opium are beneficial.

The calomel is given in doses of one grain with one twelfth of a grain of opium, and may be repeated every ten minutes, quarter or half hour; but the frequency with which the medicine is administered has one effect, which must sometimes be injurious, namely, that it disturbs the patient, and often tends to bring on that restlessness, which we so wish to avoid, and which is so distressing to witness. If, therefore, this appear to be the case, and the medicine does not seem to be doing an equivalent of good, it will be better to change the remedy.

Now, though collapse, with vomiting and rice-water dejections is the characteristic form of true algide cholera, yet are there variations, depending, either on the predominance or absence of one or two symptoms, or on the presence of an entirely new symptom. Sometimes the vomiting, sometimes the purging, will predominate, and then the treatment is directed either to one or the other, as the case may be, or they may both be entirely absent, while the whole intensity of the disease is thrown into the other symptom, that of collapse, which is then intense, and runs rapidly through its course. This is the dry cholera,—cholera sicca of Indian writers,—it is very rare in England—only two occurred among the

patients treated at St. Thomas's—and it is a rapidly fatal form of the disease. Although the man, whose case is related below, died, I cannot help thinking, that had he been seen somewhat earlier in the collapsed stage, he might have been saved; at least, that the chance of a cure is not diminished by the absence of purging and vomiting, if only the patient be seen early enough to allow of benefit from the application of remedies; but as the course of collapse seems more rapid, so do we generally see them later in reference to the condition of the patient, though perhaps not actually in reference to the duration of the disease.

Stephen Davis, æt. 39, had been taken to Guy's Hospital, but had been refused admission, as cholera patients were not received at that Hospital, and he was brought to St. Thomas's, 10th of August, 8 p.m. The history of the case was not easily made out, owing to the difficulty in getting the man to answer, and to those who brought him knowing little or nothing about him; but it appears that he had diarrhœa for some days, of which he had taken no notice, that about 4 p.m., while at work, he had been sick, and had laid down, but that he had not been purged since.

10th, 8 p.m.—He is very cold; skin blue and inelastic; tongue and breath cold; pulse all but imperceptible; no second sound at the heart; he is very apathetic, in fact, his condition approaches nearly to coma; but he can be induced to speak; the voice is low and whispering; the eyes deeply sunk; he is slightly cramped; the abdomen is rather swollen. (Hot-wet-sheet. D. L., Beef-tea; Arrow-root; Brandy; Acid. Nitro-Hydrochlor., ℥viii; Syr. Papaveris, ʒj; ex Aquâ omni hora.)

11th, 2½ a.m.—Happening to be called up to see a patient just arrived at the hospital, I examined into the condition of this man. The hot sheet had produced a very slight accession of warmth to the surface, and a slight increase of action at the heart, the second sound becoming faintly audible; but these good signs lasted but a short time. He is now in much the same condition as when first admitted; has neither vomited nor passed any motion; the abdomen is more enlarged, but not tympanitic; he lies with the eyes half open, and it is difficult to rouse him, so as to get an answer.

11th, 7 a.m.—At this hour he died. No change had been made in his condition whatever; but it appears that immediately before death he had moved in bed, as though attempt-

ing to turn round. One of the nurses went to assist him, but on examination found him dead. The body became warmer after death.

The next form, worthy of any note, is that in which much blood is mixed with the evacuation. I have seen not a few of these cases, which I consider less redoutable than the typical form, whether because, if the blood escapes as a whole from the congested intestine, the mass remaining in the body is less spoiled, than when a great quantity of serous fluid is drained from the blood, or whether simply because this symptom is typical of a less violent form of disease, I am unable to say; but as the consecutive fever has been severe in some of these cases, it is difficult to ascribe it simply to the latter cause.

J. Hobran, æt. 57, admitted August 11th, at 2½ a.m.—Has had a little diarrhœa for the last two days, but was suddenly attacked, at 2 a.m. while in bed with purging; after he had passed two copious motions, he observed that there was much blood with the third.

11th, 2½ a.m.—The surface, tongue, and breath are cold; the pulse is barely perceptible, not very quick; face very blue; he is much cramped. While the bed was being prepared, he passed a quantity of fluid looking like blood,

unmixed with other matters, but very black. (Ordered Hot-wet-sheet; Acid Nitro-Mur., *mvijj*; Syr. Papaveris, *3j*; ex Aquâ omni horâ.)

10 a.m.—He became quite warm after the application of the sheet, and has had only one motion during the night, still a good deal of blood mixed in it, but not so much as before. He complains of tenderness about the abdomen, more particularly in the umbilical region. Pulse 98, rather feeble; tongue coated, brown.

2 p.m.—At twelve this morning he passed a large quantity of blood, with some feculent-smelling fluid. (Hirudines, *xviiij*, statim; Abdomini circa umbilicam applicand. Enema Amyli c. Tinct. Opii, *3j*, statim utenda.)

9 p.m.—Has not had any motion; head rather hot; pulse 110; tongue brown; he feels very weak and rather sleepy.

12th, 8 a.m.—Has had no motion; passed this morning more than half a pint of turbid urine; complains of pain in the abdomen; tongue and pulse the same as last night. (Hirudines *xij*, Epigastrio.)

8 p.m.—He passed to-day a large quantity of hard bilious fæces; still complains of headache.

13th, 9 a.m.—Bowels have not been relieved since yesterday; his head is hot, and the eyes look heavy; pulse 98, rather hard;

passes urine without pain. (Enema commune, statim.)

8 p.m.—The enema brought on such over-action of the bowels, that in above five hours he was ordered to have one of starch and opium, which checked the purging; however, the headache and hardness of the pulse were much relieved.

This patient regained strength so rapidly, that he required no more than some attention to diet, and medicine for a cough, to which he had been long subject; he went out on the 21st, cured. It is useless to add other similar cases, that one is taken which best illustrates the particular symptoms, since a larger quantity of blood passed in this case, than in any other. One must be careful not to fall into an error with regard to this complication, when women are the subject of the disease, for in them a discharge of blood from the genitals not unfrequently occurs; the amount of this bleeding is, however, generally smaller, than when the hæmorrhage is from the intestines, and in this particular it is not unlike menstruation; but, on the other hand, it takes place in the aged, in whom this function has long ceased, in pregnant women, and at undue

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periods ; in fact, many circumstances show this discharge to be not catamenial, but simply a consequence of that internal congestion so often spoken of, and in which, the uterus, &c. of course shares, as proved by the post-mortem appearances.

These are the peculiarities most worthy of notice, in this algide stage ; others occur in the next phase of the disease, and will be noticed when that is under consideration.

CHAPTER V.

PROGNOSIS IN THE ALGIDE STAGE.

IN spite of all treatment and all care, it is evident, however, that the cholera poison is so powerful, its action so violent and rapid, that the patients must often succumb in this collapsed condition just described; some appear to be almost doomed from the first to this fate, for no means, no remedy, makes, upon certain patients, the slightest impression, and therefore it is useful that we should endeavour to sum up those conditions and symptoms, which would lead us to express less hope of certain patients than the little afforded us in most cases of the disease.

Age has a marked influence, children under eight years recover less often than people at any other time of life. Old people, who are still hale and fit for work, are the next best subjects to healthy adults.

Drunkards are more liable to the disease, than sober people, and with them it proves more fatal; very poor people, who have been half-starved, or confined to wretched diet, have but a poor chance of weathering the storm. Other coexisting disease renders the sufferer very incapable, according to its intensity, of living through the brunt of a cholera attack.

Peculiarities in the symptoms, which would cause us to give a more than usually unfavorable prognosis, are very variable; but still some few may be judiciously noticed, as more than ordinarily fatal. If the patient have passed through an algide stage, and becomes again collapsed, it is scarcely possible, that he should recover. I have never seen any one live, who became twice algide. If the application of the hot sheet does not cause the cheeks, nose, or tongue, to become warm, the prognosis is unfavorable; and if they become warmer during its application, but afterwards relapse almost immediately, or after a short interval, there is but little hope.

The more discoloured the skin, and the more it has lost its elasticity, so that a fold pinched up remains erect, the worse, *ceteris paribus*, is the case. The skin of an old person is of itself rigid; but that of a young one, who is not

emaciated, is scarcely to be rendered so inelastic, as to retain the fold; and that of a young woman with sufficient *embonpoint*, would, if rendered so unyielding, denote a great intensity of disease. If the skin have been dry and hard, and suddenly become clammy with cold perspiration, it is probable that death is at hand; but in the commencement of the algide state, moisture of the skin, which may or may not continue through the disease, does not afford sufficient ground for prognostics. It has been already mentioned, and has also been pointed out by Dr. Parkes, that a sudden and localised return of warmth to parts of the body often precedes death, and it appears to me, that this sign is more certain and constant, when the return of warmth is on some part of the trunk, rather than on the extremities, for often a hand or a thigh, according to the position, in which the patient is lying, will be accidentally warmer than the rest of the body.

The purging may continue almost to the moment of death, but it generally stops some time before this event; if the purging cease suddenly, without the disappearance or diminution of other bad symptoms, it is of evil omen; and if, when the purging has, for some time, been suppressed, the abdomen be found swollen,

but not tympanitic, returning a dull sound on percussion, it is a sign that the effusion of fluid into the intestinal canal continues, but that it is retained, either because this tube has lost its irritability or its muscular power, therefore this also is a bad sign. When vomiting has continued very constantly for three days, we can hardly hope to subdue it, when, as it sometimes does, after having lasted thus long, it comes on every quarter or half hour, even if nothing be taken; and if the patient lie between whiles apathetic, and as though asleep, just rousing to vomit, and falling again into the same state, no hope can be given. This was the condition of five patients under our care. If vomiting cease, but the patient refuse both food and drink; and there be not a corresponding alleviation of the other symptoms, it is an equally bad sign with the similar cessation of purging. When the matters vomited have, after some time, become dark green, but transparent and clear, like cajeput oil, the vomiting is hardly to be checked, though it has stopped in some such instances.

In many patients the breathing became, just before death, much more rapid, and though an increased rapidity of breathing in the algide stage is not constantly a bad sign, it is gene-

rally so, if, with this hurried respiration, the surface still remain generally cold; but, if the surface become throughout warmer, this change may rather be reckoned a sign that collapse is about to pass off. Hurried respiration, however, if it supervene while the patient has been long in collapse, and when the hot sheet and other remedies have been tried in vain, is almost always a fatal symptom. After external warmth has been applied, the skin will often be warmer to the touch, and the pulse even will be stronger; but when the second sound of the heart, if it were previously absent, do not reappear, but little faith is to be placed on the other signs of amendment.

The mind generally remains sound to the very last, but it is not active, and the senses seem rather dulled; there is usually a certain amount of apathy when the collapse has been protracted; but when this apathy is so complete, as to border on a comatose condition, so that no apparent discomfort, no pain, no disturbance, can produce a sign of dislike or impatience, or if such sign be instantly succeeded by the same somnolent condition, and if we cannot, by speaking loud and shaking the patient, procure an answer, but only an opening of the eyes and a half attempt to speak,

he is in the greatest danger. If cramps have been frequent and painful, but suddenly cease without a corresponding alleviation of the other symptoms, and in such manner, that we cannot ascribe that cessation to any treatment, nor to a return of circulation and warmth, then is it of evil prognostication, and bespeaks a loss of nervous irritability.

In many of these signs, there will be certain variations and differences, in part according to the period of the epidemic, in part according to the age and constitution of the patient; but, as far as they go, these particular sets and combinations of symptoms are believed to be, as reported, of great prognostic value; but in certain cases, even when the patients are young, previously healthy, and not addicted to drink, death will occur very suddenly and without any distinct forewarning; therefore signs of good omen are hardly to be implicitly relied on; a gradual diminution and disappearance of one bad symptom after another, must and should always give us great hopes of recovery; but even then many circumstances may combine to render these unstable and fallacious; for instance, the patient may fall into a second algide stage, or death may occur suddenly, or urine may not be secreted, or other conditions, which will be

shortly considered, may arise and shame our prophecies.

It is difficult, or quite impossible, to discover, except in one or two cases, which happen to have been under medical care at the time, when the algide symptoms first began, and therefore it is difficult to fix the duration, through which that stage may be prolonged. The shortest time, which can be affixed to any case, occurring under my observation, was about eight hours, and the longest, during which it lasted, before causing death was between seventy and eighty hours; of course slight fluctuations between better and worse occurred during that period. The average, collected from 100 cases, is fifteen hours. It is curious, that old people appeared to live longer in a state of great prostration, and with all but imperceptible pulse, than patients of a younger growth, a circumstance which may perhaps be attributed to their tissues requiring a less constant supply, and a less nutritious quality of blood. Drunkards generally died early in the disease, as also did those suffering from chest maladies.

It is not possible to form any conclusion, from the intensity of collapse, as to the amount of febrile disturbance in the next stage; but a

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slow and gradual reaction, when the algide symptoms are yielding, without much hardness of pulse, flushing of the face, headache, or depression of spirits, should lead us to hope a mild and benignant febrile stage, which will rapidly give way to entire health.

CHAPTER VI.

FEBRILE STAGE OF CHOLERA.

WHEN the patient, either by the innate strength of his own constitution, or by the successful influence of the remedies employed, rallies from the algide stage of the disease, a reaction takes place, and he is exposed to dangers from the opposite extreme. The pulse, which at first might have been imperceptible, begins to flutter at the wrist, and is soon more evident and stronger, the action of the heart becomes more audible, the skin warmer by degrees, those parts first regaining their temperature, which lost it last. The apathy disappears, the purging and vomiting diminish. Now this reaction may either have been brought about quickly, as in some cases is effected by the use of the hot-wet-sheet, or it may have been a more slow and gradual return of circulation and of warmth; but, in either case, it does not stop at a healthy amount of

action, but runs on to a state, which may be called consecutive fever, and which seems to be a struggle of the heart and nervous system, to get rid of and disperse the congestions, which still obstruct many parts of the body. The symptoms are a rapid, generally hard pulse, varying, in different cases, between 90 and 120, a hot, dry and harsh skin, a brown, or white and dry tongue, which is generally redder than usual. Pain and fulness in the head, and a flushed face. Giddiness and singing in the ears, and generally suppression of urine.

There has been, in the course of this volume, frequent occasion to speak of suppression of urine, and it has been said, that this symptom would be particularly examined, since it is of some little importance as a critical sign. In the first place, the commencement of the suppression appears to take place, about the time, when the violent purging and vomiting, which usually, immediately precede the algide stage, first begin; but it is more difficult to judge, whether it continues in every case throughout that stage. Patients will often declare, that they have passed urine with the motion, and often, when the motion, very small in amount, is perfectly colourless, which would not be the case, where there any admixture of

urine; and when, besides, there is no sign of the sheets having been wetted with this fluid, whence we may conclude, that they are often mistaken as to this fact. There is no doubt, at all events, that, throughout the algide stage of the disease, the urine is usually suppressed, though three cases occurred in the hospital, which were fatal in that condition, and in which, after death, a large quantity flowed from the bladder. The time when the secretion is re-established, is very variable; some patients pass a small quantity in twenty-four hours, after the collapse has passed off; during the first day of consecutive fever, others not till the fourth day, or ninety-six hours after that event, and in some cases, there was no return of the secretion at all. The patients, generally speaking, complained of pain in the bladder, and also in the loins, if urine was absent two days and upwards, and of great desire to pass water; sometimes this was followed by the painful evacuation of a small quantity of turbid urine, and sometimes the catheter failed to draw off any fluid whatever; the secretion might be afterwards restored. In other, rather more rare cases, when the bladder was not irritable, no water was passed, until a considerable quantity had collected.

The urine, which is first evacuated, is turbid and high coloured, particularly if the quantity is small, and it contains albumen, as shown by the test of heat and nitric acid. The quantity of albumen varies, according to the intensity of the disease, and to the time during which suppression has continued, from a simple cloudiness on application of the test, to a very considerable amount. The mucus-like deposit, which is also in greater or less quantity, according to the above circumstances, usually contains fibrinous casts of the tubuli uriniferi. In slighter cases, and where the secretion recommences early in the disease, these are not to be detected, but in severe cases, and when the secretion had been absent several days, they are in considerable quantity.

Now, in reference to the critical re-appearance of the urinary secretion, the following may be observed: when it is passed within thirty-six hours after the disappearance of the algide symptoms, recovery from the consecutive fever is generally shortly established; but when three days have elapsed, before the appearance of urine, the recovery will be longer; and when four days are gone by, and the secretion is still absent, there is great reason to dread a fatal termination. Some patients never regain the

power of secreting urine, of which the following is an instructive case.

Donald Thane, æt. 35, policeman, a strong healthy-looking man, was admitted into St. Thomas's Hospital, 2d August, 1849, 9 p.m.

He was unwell, and purged once without pain at 4 this morning. At 2 p.m. he was seized with more violent purging, and with vomiting. He passed urine last night.

9 p.m.—The skin is pale and slightly ash-coloured, but is not cold; the tongue or breath are warm; pulse 94, weak; tongue white and coated. He has not been cramped; is much purged; voice husky. (D. L., Beef-tea, Arrow-root. Mist. Acidi Nitro-Mur., m viij ; c. Syr. Papaveris: omni horâ. Catapl. Sinapis Ampl. Abdomini.)

25th.—He has been much purged, during the night, with dirty rice-water evacuations, and he vomited twice; tongue the same as yesterday; pulse 100, but with a little more power; has passed no urine. (Sumat. Misturam; ex Inf. Catechu.)

26th.—The purging has much subsided; the motions have a little more consistence; but are free from bile, and of a clay colour. He complains of heartburn; pulse 90, with more

power; tongue perhaps a little cleaner. (Sumat. Hyd. Chlorid., gr. v; Opii (crude), gr. j; hâc nocte.)

27th.—The heartburn still continues, and he has considerable hiccough; pulse 100, a little hard; face is now rather red, and the eyes are injected. He has passed a consistent and coloured motion; but no urine whatever since his admission. (Hirudines, xij, Abdomini; Liniment. Terebinth. Lumbis infricandum; Spt. Æth. Nitrici, ʒj; Tinct. Scillæ, ʒss, e Mist. Potass. Tart., ʒiiss; 4^{ta} horis.)

28th.—The hiccough has almost disappeared. He is now sitting up in bed, and says that he feels much better; but has a good deal of pain and fulness in the head; pulse 100, large and rather hard; has passed no urine. (Gin. ʒiv; Enema Commune, statim.)

29th.—The bowels were freely opened during the night; but he has passed no urine; this is the fifth day. Pulse 110, hard and large; tongue white at the edges. Complains of more headache; skin hot and dry. (Adde sing. dos. Misturæ Pot. Iodid., gr. iij.)

30th.—Still no urine; he is getting very drowsy, but can still be roused. In the afternoon muttering delirium came on. (Enema Terebinth., ʒj, statim; Tinct. Cantharidis, mx;

e. Mist.) The catheter was passed, and drew off about six ounces of dark-coloured urine.

31st.—Is quite comatose; pulse 120, hard, and irregular. (Hirudines, v; utraque temporis; Galvanism to the loins.)

Sept. 1st.—Died at 9½ a.m., with slight convulsions.

This case is interesting, since the algide symptoms were very slight, in fact all but absent; yet the consequences so severe, and the suppression so obstinate. The next case presents a much more violent set of algide symptoms, combated with great difficulty, and the same subsequent stage.

Wm. Robinson, æt. 24, sailor, a strong, healthy-looking man, but for the present disease, was admitted into the Cholera ward the 14th of August, 1849, at 9 a.m. He was unwell, with slight diarrhœa, all yesterday afternoon, and with sickness at the stomach, though he did not vomit; about five this morning he was taken much worse, with violent purging and vomiting.

August 14th, 9 a.m.—Surface, tongue, and breath cold; eyes sunk; countenance discoloured and anxious; pulse imperceptible;

has cramps. (D. L., Beef-tea; Arrow-root; Hot-wet-sheet; Brandy, 3j, ex Aquâ Calidâ.)

2 p.m.—After being taken from the sheet the surface was warmer, and the pulse could be felt, but the tongue was still cold; in half an hour the temperature of the surface again fell, and the pulse was lost. (Hot-air-bath at 180° for twenty minutes. Mist. Acid. Nit.-Mur. e Syr. Papaveris, omni horâ.)

8 p.m.—The surface became warm in the air-bath, and the pulse perceptible; he remained in that state during the day, and has passed four small rice-water evacuations; has vomited twice, the ejected matters consist of fluid with floating shreds, slightly coloured with bile.

15th, 9 a.m.—Pulse 100, rather large; complains of weariness and oppression; passed no motion during the night, nor has he passed urine since his admission.

16th, 11 a.m.—Pulse 100, hard; eyes full and injected; complains of headache; fever is coming on; had a consistent and deeply-coloured motion during the night. (Hair to be cut close.)

10 p.m.—The headache has become violent; the forehead and face are very hot, and the carotids beat with much force; no urine since

admission. (Hirudines, viij, utrique tempore Aqua frigida capiti.)

17th, 9 a.m.—Is very drowsy, but can still be roused, though he immediately relapses; pulse 110, large and hard; has not passed urine, nor any motion, since last report. (Enema commune.)

9 p.m.—The enema brought away a small quantity of feculent matter, but no urine has been passed; at 2 this afternoon the catheter was introduced, but no urine flowed; he was then bled to six ounces, but is now deeply comatose; pulse 100, sharp.

August 18th.—He never recovered the comatose condition, but died this morning at 7 o'clock.

The kidneys were examined in the former of these cases, and found to be highly congested, with spots of extravasation in their substance.

It is on account of such cases as these occurring every now and then, that it has been previously said, that a patient is not to be considered safe, until he has passed urine; and although it is more probable, that obstinate suppression will occur in a case, where the algide symptoms are severe, than in one where they are milder, yet the former of these ex-

amples shows that it may follow a very slight algide stage, and be then as obstinate, as though a more violent form of the disease had preceded.

Now, if urine be passed within twenty-four hours after the disappearance of collapse, the following is generally the course of events. The pulse begins to diminish in frequency; the oppression of head to decrease; the skin becomes by degrees soft and moist; the tongue loses its white coating; appetite, often most ravenous, returns; and the patient may usually be allowed to rise about the fifth or seventh day. Where the urine does not appear till within seventy-two hours, the symptoms of over-action last longer, and the recovery is more protracted, from seven to ten days; but in either case, when the symptoms are quickly retrograding, towards the healthy condition, the patient will only want a little soda-water, or effervescing citrate of potash, and some regulation as to his diet, lest his voracious appetite lead him to exceed all bounds, while he is still in a state, when such an excess would be not unlikely to prove fatal. In some cases, however, when urine is passed tolerably early, recovery does not take place thus, and we cannot certainly conclude from such an occurrence

that the patient is safe ; neither does the amount of prostration, during the algide stage allow us to form a sure diagnostic, as to the subsequent course of the disease, since great febrile disturbance will not unfrequently follow a mild algide stage ; and some of those brought to the hospital in the deepest collapse, were affected by very slight febrile symptoms, as was the case with James Garatty, and others. If, within the sixth day after the entire disappearance of collapse, the febrile symptoms do not begin somewhat to abate, or if the oppression, and lowness of spirits become greater and the pulse weaker, the probability is, that the patient sinks into a far worse state by gradual and slow degrees.*

* An eruption sometimes occurs in the febrile period of the disease, which, however, does not appear so common in England as on the continent, according to foreign writers on this malady. It begins with a redness of the skin, particularly on the hands and feet, which at first is like erythema. After about eighteen hours this disappears in parts, leaving still red spots, similar to erythema nodosum; these red places contract, so that small blots only of the eruption remain, which again increase in size and then fade; the whole phenomenon is followed by desquamation. In some cases the eruption, however, went further, and it was then likened to measles, and spread over the whole body. No case with this well-developed form occurred under my observation. It does not appear to cause discomfort, nor to be of any critical importance.

CHAPTER VII.

CHOLERAIC TYPHUS.

WHEN, about eight days after the recovery from the algide stage, the above febrile symptoms continue unabated, or rather increased, the fever assumes a more typhoid character. The pulse, retaining about the same rapidity, becomes weaker, smaller, and more compressible. The skin is not cooler, but is frequently covered with a clammy perspiration; but sometimes is dry and hot. The patient is extremely apathetic and depressed; he sleeps a great deal, or lies in a state approaching sleep, with the eyes but half closed; and though easily roused by speaking to him rather loudly, he relapses almost instantly. He has no appetite, but will generally take anything offered, when a little pressed to do so. There is often considerable thirst; the tongue is coated thickly. When questioned, it usually can be elicited

that he has pain, and great heaviness in the head.

As the patient grows worse, the semi-sleep or semi-coma, in which he lies, becomes deeper, and is often accompanied by low muttering delirium, and rolling of the head from side to side. The headache continues, and the patient makes this his chief complaint: the eyes are injected, the face red, and the whole head hot. He will also complain of giddiness, and noise in the ears; of overpowering fatigue; and he is sometimes impatient at being roused. There is, generally, nightly delirium; in fact, all the objective and subjective signs of congested brain; the pupils are, generally, rather sluggish.

In many cases, the breathing was oppressed, and performed rather by deep and long-drawn sighs, than in the usual quiet manner; the tongue becomes more thickly coated, and in the worst stages, black and dry. Thirst is always present; but there is great dislike to any food.

The urine, excreted during this fever, is high coloured, often has a powerful odour, and contains throughout more or less albumen. From the time, indeed, when urine is first passed, it contains this principle, and the amount of it

gradually diminishes as recovery advances ; but if it be found, that this diminution either does not take place, or that it is very slight, a severe form of choleraic typhus may be expected ; it will, perhaps, decrease during the very brunt of that disease, and steadily continue to do so ; but in the generality of cases, while the patient continues to sink, the urine still contains albumen, and often, moulds of the uriniferous tubes. The patient frequently complains of pain on passing water. The urine is apt to ferment within a very few hours, and exhales a strong and peculiarly unpleasant odour.

This state, which, in general appearance, is exactly like typhus with brain congestion, is as much a part of cholera, when fully developed, as the algide stage itself. Its treatment does not differ very materially from that of typhus fever with head complication. Wine should be given in quantities varying from two to six ounces, or even more, daily ; what light nourishment can be administered should be pressed upon the patient ; blood should be taken from the temples by six or twelve leeches, or more ; and ice applied to the shaven scalp by means of a bladder. Soda-water, or effervescing saline draughts, and ice, may be administered. Chlo-

ride of potass, dissolved in a good deal of water, as the dose of five grains in two ounces of water, has a decidedly beneficial effect; the tartrate of potass mixture is also useful.

Sometimes the bowels are confined, and there is a slight tendency to yellowness in the conjunctiva; now in these cases all drastic, or irritating purgatives must be carefully avoided, for the intestinal canal is still in an irritable state, and may easily be stimulated into over-action. It is better, therefore, to trust to enemata for procuring action; and the turpentine enema may be useful, not only for this purpose, but also as a derivative from the brain. Sometimes there is looseness of the bowels; or the motions show, by their clayey colour, an absence of bile in the intestines. In both these cases it is useful to give calomel, or mercury in some form; in the former, two grains of calomel every four hours, letting the patient have three doses, and then a common enema will bring away properly coloured stools, and often considerably relieve the head symptoms; in the latter, two grains of chalk and mercury every two hours will first cause the stools to become bilious in colour, and then consistent and healthy. Ptyalism may be produced by this mode of

treatment, and, provided it be only moderate, is not to be regretted.

If there be diarrhœa, and the motions be plentifully mixed with bile, it may be checked by the usual astringents, or, which appears to me better, the nitro-muriatic acid may be continued, as in the algide stage. If the syrup of poppies be objected to, it may be replaced by simple syrup, to cover the nauseous flavour of the acids. Opium should, of course, be avoided, as it only adds to the tendency to head congestion; and the looseness of bowel, which sometimes attends this fever can be checked without recourse to this powerful and much-abused drug,—indeed, it generally will cease, even if left entirely to itself; but opium may be necessary when mercury is to be used. During the rice-water purging, a great quantity of epithelium cells are passed from the bowel, of course first separated from the intestinal walls; and autopsies of those dying, while such stools continue, have proved that the small intestines are more or less bared of their epithelial covering, as Professor Boehm has pointed out, and that their various glands are swollen and inflamed. During the febrile stage, autopsies show these injuries in the process of repair. Thus it is evidently hurtful to

give irritating aperients, as above insisted on; but as the large intestines appear very little changed, in comparison to the small, and as experience has proved such remedies harmless, turpentine enemata need not, on this account, be dreaded.

Ptyalism, I have stated above, is not to be regretted, because in many cases it is not only useful, but an object to be desired. The particular instances, in which this may be recommended are those, where the symptoms of oppressed brain, predominate over those of weakness or of sinking; in which delirium assumes a type bolder than that of low muttering, where cross answers are returned to even the simplest questions, and where there is any icteroid discoloration of the skin or conjunctiva. In these cases, ptyalism itself is often not by any means easily produced; but the beneficial action of the remedy will be seen in the gradual alleviation of the head symptoms. While giving this medicine, the patient's strength must be supported by wine and nourishment, and, as soon as the prominent signs of head congestion disappear, particularly if those of weakness take their place, the remedy must be discontinued. This powerful means, then, may be sometimes carefully employed;

its action must be watched, and it never should be given, when the pulse is very low, and must be discontinued, when this fails.

Notes of cases, one of a milder and one of a severer form of this fever, may serve as examples.

Jane Ramson, æt. 37, a tall and powerful looking woman, admitted into the Cholera Ward, 8th August, 1849, at 11 a.m.

She was taken ill on the night of the 5th, with purging, and gradually got worse, till to-day, when she vomited a great many times.

8th August, 11 a.m.—Countenance anxious, not discoloured; surface and tongue cold. Pulse 100, very weak. Has passed one rice-water evacuation, since admission, and has been much cramped. (D. L., Beef-tea; Arrow-root; Brandy; Hot-wet-sheet; Acid. Nitro-Mur., $\mathfrak{m}\text{viii}$; Syr. Papaveris, $\mathfrak{zj}$; omni horâ: Catapl. Sinapis. Abdomini; Ice in small quantities.)

8 p.m.—Was taken out of the sheet quite warm, and with more pulse. Has vomited twice since admission; but has not been purged. Pulse 90, more power.

9th.—Passed a copious, slightly tinged mo-

tion, perfectly liquid during the night. Pulse has more power.

10th.—Pulse hard and rather large; has inclination to vomit, and was purged twice since last report; tongue coated. (Sumat. Mist. secundâ quâque horâ; c. Tr. Opii, miv.)

11th.—Face rather flushed, and eyes injected; complains of pain in the forehead and ringing in the ears; has no appetite; pulse 90, large; breathing a little oppressed; passed urine containing albumen.

12th.—Face and eyes more full; the carotids beat strongly; head hot; complains of feeling languid and weary; evident depression of spirits; can eat nothing, but is thirsty. (Hair to be cut and thinned; Cold to the head; Ice.)

13th.—Is very restless, and throws herself about; the flush of face and headache continue; pulse 86, somewhat softer; bowels well opened last night; has no appetite, and can be induced to take nothing; thinks she might eat an egg; allowed.

14th.—There is less fever, but great depression, headache, and sleepiness; skin is hot and a little moist; tongue cleaner; no tenderness of the abdomen.

15th.—She is very restless, but not delirious;

face pale, and eyes no longer injected; complains, that she does not sleep; pulse 84, softer; tongue nearly clean.

16th.—In much the same state; complains that she does not, and cannot sleep; there does not seem any congestion about the head, and she is quite rational; bowels open twice yesterday. (Habet Morphiae Hydrochloratis, gr. ss, hæc nocte, et rept. si opus sit.)

17th.—Is more cheerful, and evidently better; complains of a little headache; pulse 90; tongue rather brown; urine free from albumen.

18th.—Feels much better; is up, but rather weak; has great appetite; is rather purged; stools feculent, with plenty of bile.

19th.—Purged six times since yesterday, but is otherwise well. (Habet Pulv. Cretæ Co. c. Opiv., ʒj; statim.)

21st.—The purging ceased after two doses of the remedy; she is tolerably strong, and has been walking about, and expresses a great desire to leave the hospital. Discharged cured.

I was requested, on Sept. 2d, to attend a woman residing in the neighbourhood of the hospital, who was said to be suffering from cholera.

6 p.m.—The body and tongue were cold,

the breath cool; pulse 90, very weak; she had much vomiting and purging, and some cramps; there was but slight discoloration.

A sheet was wrung out of hot water; she was wrapped therein, and placed on a mattress on the floor, and covered with blankets. (*Acidi Nitro-Hydrochlor.*, ℥viij; *Syr. Papav.*, ʒj; *ex Aquæ Destillatæ*, ʒj; *omni horâ.*) At the expiration of an hour, after having another dose of the medicine, she was removed from the sheet, and put into a warm bed, with a hot bottle for the feet; she had passed one motion in the sheet, and had vomited twice. The cramps have disappeared; surface of the body quite warm, and also the tongue.

12 nocte.—Has been twice purged, and continues sick. To continue the medicine, and to have but half a wine-glassful of soda-water at a time.

Sept. 3d, 9 a.m.—Her husband sat up with her. She had not vomited, while the plan of treatment, which I explained to him must be strictly observed, was persisted in; but he foolishly yielded to her craving desire, and gave her a pint-mugful of water; she drank it all, and the sickness returned. Pulse 100, weaker than at 12 last night; tongue white at edges and brown in the middle; has not been

purged, nor has she passed water. (Cat. Sinapis Abdomini.)

9 p.m.—Found her better in the middle of the day; she has vomited twice since 12 m., but the pulse is stronger; no urine. (Habeat Hydr. Chlorid., gr. v; Opii, gr. j; statim.)

4th, 9 a.m.—Was purged copiously during the night, the stool was not quite liquid, and had some admixture of bile. She has not vomited since last night, and feels much better.

9 p.m.—Has been sitting up in bed, complains of thirst, and of cutting pains in the bladder. Pulse 95, rather large. Omit the acid mixture.

5th, 10 a.m.—Passed, about two hours ago, nearly half a pint of albuminous urine; says she feels well, but weak. (Sumat. Mist. Potassæ Citratis Effervescens 4th horis.)

6th, 10 a.m.—Complains of weariness, and of pain in the head. Pulse harder, 100. Bowels have not been open. (Enema commune statim.) She passes a good deal of water, which deposits a white cloudy matter like mucus.

9 p.m.—There is less pain in the head than before the bowels had been opened by the enema.

7th.—Much the same, but the face is red,

and the eyes injected. (Sumat. Potass. Chlor. gr. v., ex Aquæ Destillatæ, ʒiiss; 6th horis.) Pulse full 110.

8th.—The pain in the head is worse, there is great depression of spirits; she lies with the eyes half-closed, but answers rationally, when addressed, though she appears indifferent to all about her. Pulse 110 less full and hard; tongue brown and moist.

9th.—Was muttering and talking all night in a low tone; had some bleeding from the genitals, which alarmed her, because she says, she is more than a month gone in the family way. She speaks only when questioned. Head hot, face more flushed, and eyes injected. Pulse 100. Carotids beating strongly. (Habeat Enema terebinth. Statim.) Ice in a bladder to the head.

10th.—The enema brought away some feculent matter, but the oppression continues; she was again delirious last night, spoke louder, and seemed to think she was in her father's house. (Sumat. Hydr. c. Cretâ, gr. ij., 2^{dis} horis.) In the evening, when roused, and spoken to, she stared for some time, then seemed to take me for her father, said her husband was kind; but she had miscarried with

her first child. (She had never been in the family way till the present time; the bleeding evidently dwelt in her mind.)

11th.—Much the same, bowels have been opened, face a little paler, pulse less sharp.

12th.—Eyes less injected; face more natural; she did not so constantly talk during the night; but had some quiet sleep.

13th.—Is much better, but her spirits are much depressed; delirium has ceased; face pale; tongue white; pulse 90, not so strong; bowels freely opened last night. (Sumat. Pulv. 6th horis. Wine ʒiv.)

14th.—Bilious purging has come on, and she seems much weakened; there is a little mercurial fetor of the breath. (Omit. Hyd. Chlorid.; Enema Amyli c. Tinct. Opii, ʒxl.)

15th.—The purging stopped after eight motions; she is very weak, but has no pain in the head; to have Beef-tea and Arrow-root. Wine ʒvj; one Egg.

16th.—Much better. The patient gained strength pretty rapidly; on the 24th got out of bed, and was soon well. She afterwards bore a healthy child.

CHAPTER VIII.

MORBID ANATOMY.

It may be interesting to annex a translation of Messrs. Reinhardt and Leubuscher's account of the Morbid Anatomy of Cholera, since I am not aware, that any so minute examinations have been instituted, or published in this country. These gentlemen do not attempt any theory of its pathology, probably because their views did not agree, since Leubuscher says, in a note, (p. 512,) "I consider cholera as a primary affection of the intestines, whence arise the changes in the condition of the blood; Reinhardt looks upon the intestinal disturbance as the effect of a primary alteration of that fluid."

Digestive Organs.

Intestines.—The small intestines of those dying in the algide stage, are almost always seen to be, even externally, of a rose-red hue, while

the large intestines retain their normal colour. Both contain, and are somewhat distended by, a fluid similar to rice-water. The mucous membrane in the small intestines was constantly abnormally red, which arose from a pretty general congestion of the smaller venous branches. This venous congestion extended generally throughout the small intestines; but increased in intensity from the duodenum to the cæcum, being commonly, therefore, most marked in the lower part of the ileum. In the large intestines, also, the veins were usually congested, not so regularly throughout the whole bowel, but in larger or smaller districts of mucous membrane, between which were portions of more healthy structure. Sometimes this last-described congestion was altogether absent, or limited only to small spots, chiefly situated in the cæcum and rectum, or, when present in other parts, was still most marked in these.

There was always present, moreover, an intense *capillary hyperæmia*, recognised by its bright red colour, depending upon the injection of capillary trunks and branches, and combined with more or less extensive extravasation of blood into the mucous tissue, which sometimes occurred only in small patches about the small

and large intestines, sometimes (more particularly in the ileum) the spots of extravasation were larger. That intestine (ileum) was not unfrequently affected, throughout several feet of its length, with intense capillary hyperæmia, which imparted to its lining membrane a vivid scarlet colour, and was accompanied with patches of extravasated blood. This hyperæmia nearly always began immediately over the cæcal valve, seldom a foot or more above that structure, and extended along the ileum, its intensity gradually diminishing from below upwards. We have never seen in the large intestines such extensive congestion; but have frequently found it in smaller patches.

The condition above described, combined with more or less extravasation, gives rise to the bloody evacuations. We have never failed, wherever these occurred during the algide stage, to find those appearances in the small intestine; but have seen no case in which bloody stools, during the algide stage, could be ascribed to changes in the large. The constant presence of smaller patches of congestion and extravasation explains, why unchanged blood-corpuscles are not unfrequently found in the rice-water evacuations; if this abnormal state be somewhat more extensive, the rice-water stools become

slightly yellow, from admixture of blood; and from this slight tinge to an intensely bloody evacuation, are many steps, just as the capillary congestion is, in different cases, of various extent and intensity.

The mucous membrane, moreover, appears more or less strongly infiltrated, its folds enlarged and swollen by an exudation chiefly serous; the villi often appear erect and full, as is the case during active congestion, giving the gut a dusty appearance.

Examined under the microscope, the mucous membrane, particularly of the small intestines, is found more or less entirely deprived of epithelium. This structure is, on the villi, sometimes absent, sometimes only present in scattered patches, whence it is easily separable by pressure; but the cells are found in great quantities, and in tolerable preservation, in the rice-water-like fluid which fills the small intestine. Indeed, Boehm truly observes, that they are here seen in much larger quantities, than in the rice-water evacuated during life, in which such cells are always present, as we ourselves have found.* There is, however, less of this unchanged epithelium in the large intestines, therefore it must, doubtless, be altered, and

* I may also add my testimony as to this fact.—R. B.

destroyed, during long continuance in the bowel.

The villi themselves presented different appearances. They were often, under the microscope, tolerably transparent, and then no other microscopic element could be observed except fibrous tissue; but often, like Boehm, we found those of the duodenum and upper part of jejunum containing large drops of oil. In the ileum, and particularly in its lower part, the villi were filled with a finely granular mass, consisting of oil drops, and molecules of *protein*, and this often to such an extent, that they were perfectly opaque. We shall not enter here into the origin of this substance, whether, namely, it is to be regarded as chyle, or as a granular exudation into the villi. Sometimes, in those dying in the algide stage, we observed in the lower part of the small intestines, that a large extent of mucous membrane was infiltrated with a firm, whitish, and amorphous exudation, which was situate in the superficial layer of that membrane, and so inclosed the villi, as to render them, in those spots, invisible.

The surface of the intestine was always pretty thickly covered with a slimy substance, consisting of amorphous mucus, mucous-corpuscles, and of unchanged, or of more or less dissolved,

epithelial cells. Portions of this mass, when evacuated, form the white shreds, found in rice-water motions.

The *Solitary Glands of the Small Intestine* were constantly more or less enlarged. This enlargement, like the congestion of the bowel, was always most decided at the lower part of the ileum, and diminished in ascending. The swollen glands were often surrounded by a red circlet of congested vessels; but this still more often was not the case. The size of these enlarged glands varied, from that of a mustard-, to that of a hemp-seed; often they were elevated above the surface, and then assumed a wedge-like form, being connected to the intestine by the thinner extremity. They often collapsed, when punctured or cut into, but more frequently, particularly if greatly enlarged, they did not do so, but presented a hard firm appearance. In the former case, their increased size was caused by the accumulation of a large amount of fluid, in the latter the contents were solid; and this solid matter was not confined to the gland, but even encroached on the surrounding membrane. This material appeared, under the microscope, an amorphous, homogeneous, or finely granular substance, which was rendered transparent by treatment with acetic

acid and caustic alkali, and then presented some, but very few, oil globules. The fluid, evacuated by puncture from some of these glands, presented the same elements as the follicles normally contain, viz., cells, granules, and globules.

Peyer's Glands had almost always undergone some change, more particularly in the lower part of the ileum, immediately above the cæcal valve; the appearances differed considerably. Sometimes these structures were the seat of a vivid capillary congestion, which might comprehend the whole group of glands, or only a part of it; but generally instead of hyperæmia, the patches were of a clear white colour. In many cases, we observed more or less enlargement of the simple glandular sacs, without perceptible thickening of the intervening mucous membrane. The patches had then a granulated appearance, the single enlarged glands being easily distinguishable. They presented, when in this state, the same minute appearances as in the solitary glands, which has already been described. More frequently the mucous membrane and the single sacculi, which form these patches, are infiltrated with a white somewhat firm substance, which often extends into the sub-mucous cellular tissue, as Boehm has affirmed.

The patches then assume the appearance of a more or less prominent, hard, white body, of round, lengthened or irregular form; its surface is generally smooth, but sometimes its mucous covering is puckered into folds and lumps; this exudation in all these cases appears under the microscope as an amorphous, either homogeneous or finely granular substance, which becomes transparent on the addition of acetic acid or of alkali. Sometimes in consequence of a destruction of the glandular sacs, many little depressions are observed, giving to the patch the appearance of a sieve, or a net-like character (*plaques reticulées.*)

According to Virchow,* this phenomenon is of post-mortem origin, caused by endosmose into the various sacculi, which absorb so much of the surrounding watery fluids, as at last to burst; we must, however, remark, that we have found reticulated patches in bodies very shortly after death, and in many cases the loss of substance has appeared to us too large to be explained simply by rupture of the glandular sac; and certainly in several, dying after the algide stage, there was some ulceration and separation of the follicles, which gave rise to this reticulation. Thus, though we will not

* Medecinische Reform, No. 10, s. 64.

deny, that this appearance may be, in many instances, owing to some post-mortem change, yet all cases cannot be thus explained. The separation of the sacculus certainly takes place during life, and we believe this always to have occurred, when in the corpse we find, not little depressions about the size of one of these sacculi, but large and irregular breaches of substance of far greater dimensions than those of a single follicle.

Brunner's Glands of the Duodenum were sometimes swollen. The glandular sacs appeared under the microscope by transmitted light, unusually opaque; they contained, besides the usual cells and nuclei, a finely granular and molecular substance.

The *Solitary Glands of the Large Intestine* were generally enlarged, but not so constantly so, nor comparatively to so great an extent, as the glands of the small intestine. They appear, when in this state, as more or less prominent lumps, varying from the size of canary to that of hemp-seed. Sometimes they were surrounded by a circlet of red injected vessels; very frequently, in the place corresponding with their opening, was a black spot caused by altered and extravasated blood. In a few cases the superficial surface of the mucous

membrane, raised by the swollen gland, was separated, or, as it were, exfoliated, whereby the top of the gland was hollowed into a cup shape. An entire separation was not in this stage observed.

These were the changes in the intestinal mucous membrane, which we noted in those dying during the algide stage. We now come to consider the appearances of the same parts in the further stages of the disease, particularly in choleraic typhus.

In a certain series, but not in the greater number, of cases, the morbid appearances were retrograding, or had almost disappeared. The congestions, particularly of the small veins, were much diminished; the larger only were now and then found gorged with blood. The mucous membrane of the small intestine was, therefore, no longer of that bright red colour formerly described, but had assumed the dirty grey or slate-like hue, which so generally remains after violent intestinal congestion. The solitary and Peyer's glands were now but slightly enlarged, or already had resumed their natural appearance. The intestine contained feculent matter. We found this appearance of the intestines, not only in those dying during the typhus, but also in those dying from some

fortuitous complication. In one of the latter cases, even when the examination was made very shortly after death, the patches of Peyer were found reticulated.

In other and more frequent cases, some parts of the intestine would present the above appearance; other parts, of more or less extent, a condition very similar to that frequently observed in cases of dysentery.

The mucous membrane of the intestines, and, in higher degrees of the affection, the submucous tissue also, was in these cases of a vivid red, violently congested, and more or less extensively infiltrated with extravasated blood. In the large intestines, the affected places are raised into the form of longitudinal or transverse folds, or of irregular warts and lumps,—a condition which chiefly depends upon œdema of the submucous cellular tissue, for these eminences disappear, as soon as the fluid is evacuated by puncture and pressure.

The hyperæmia of the small intestines is chiefly situated among the transverse folds, which are also swollen with serous fluid. One case only came under our notice, in which these changes had stopped at the above-described stage of development, and that in a man, who died shortly after the establishment

of reaction. In every other instance we found, in some part of the congested mucous membrane, an infiltration of a firm substance, which we consider, with Virchow, to be diphtherous. This exudation was tolerably dry, of a greyish or yellowish-white colour; it appeared, under the microscope, amorphous, and was rendered transparent by acetic acid or caustic alkali; but resisted, for some little time, the action of the former. The deposition of this exudation begins in the most superficial layer of the mucous membrane, and almost always lies contained in the substance of that tissue, extending partially beyond it, only in certain places, as, for instance, in the small intestines, where it fills the interspaces between the villi, and unites them into one coherent mass, in which, under the microscope, the outline and tissue of some of these processes may occasionally be distinguished. This substance afterwards encroaches on the deeper layers of the mucous membrane, and even upon the sub-mucous tissue; but these deeper strata are never found affected, unless the superficial be also involved, although the latter are often thus diseased without any participation of the former. The parts of intestine, thus affected are generally stained, on their surface, of a dirty brownish

yellow colour, by decomposed bile, and therefore these spots are at once easily perceptible. In some very rare cases, however, when, at this stage of the disease, the intestine contains no bile, the exudation retains its own peculiar whitish hue.

The extent occupied by this diphtherous deposit varies greatly; for sometimes it is found in but few of the congested spots, and in a very thin layer, lying only in the most superficial layer of mucous membrane; sometimes many large patches of that tissue, as well as two or three lines in depth of the sub-mucous structures, would be hardened and roughened by an infiltration of that morbid material.

These changes take place both in the large, and in the small intestines, sometimes in one alone, sometimes in both at once; they chiefly affect those parts of the bowel, which are most subject to the congestions found in the algide stage. In the small intestines this diphtherous inflammation chiefly attacks the ileum, and principally the part in the neighbourhood of the cæcal valve, it extends thence along the bowel, losing its intensity as it advances upward, sometimes even as high as the jejunum. Occasionally this morbid action is limited to the summit of the swollen valvulæ conniventes,

while the membrane in the intervening spaces is free from deposit, but not unfrequently, particularly just above the cæcal valve, the intestine will be covered, throughout a large extent, by this substance. In the large intestines the chief seat of the affection was the cæcum and rectum, while the interposing parts were much more slightly affected. In two cases we found the large intestines in a state of congestion with diphtherous deposit, which state was most severe in the rectum, and gradually diminished in intensity upward; these viscera had an appearance exactly similar to that of a person dying from dysentery. This condition had been manifested, during life, by frequent thin stools, mixed with flakes of mucus deeply tinged with blood. In the other cases no change in the evacuations was observed, and they do not present the same appearance, as in the first stages of dysentery, which depends, probably, on the smaller extent occupied by, and the slower development of, diphtheritis in cholera. The further changes, which this substance undergoes are, that without appearing to become more fully organised, it gradually sloughs, and the tissues enclosed therein also perish. This process begins where the material was first deposited, viz., on the

surface of the mucous membrane, and thence extends deeper and deeper. Thus arise in the intestine, when this affection has lasted sufficiently long, a number of ulcers, which at first are surrounded by this new substance; but when its destruction becomes more entire, the sores assume the form of simple ulcers in the mucous membrane. They are, however, seldom found in this condition, for the patients usually die, before the whole exudation has disappeared.

The formation of these diphtherous ulcerations usually commences in the true mucous membrane; but sometimes also in the intestinal glands. In the former case, the most superficial layer of the infiltrated membrane appears to desquamate, leaving breaches of surface of various sizes. In the second case ulcers appear in the thickened mucous membrane, over the situation of the glands, which ulcers, at first small and round, gradually increased in size, became confluent, and assumed a less irregular shape. We observed these changes, not only in the solitary glands of the large and small intestines, but also in the separate follicles of Peyer's glands, which then became reticulated.

Let us now shortly recapitulate the changes observed after death, in the intestines.

Firstly, during the algide stage, we find, more particularly in the small intestines, a congestion of the mucous membrane, which is in various degrees of intensity, from a slight fulness of venous branches, to a violent capillary hyperæmia, and rupture of vessels with hæmorrhage. Depending hereon, appears a considerable separation of the epithelium, a transpiration of a large quantity of serous fluid, and in certain places, as the glands, &c., the deposit of a hard amorphous substance. During further development of the disease, these conditions may gradually retrograde; but in the greater number of cases, the congestion, throughout more or less extent of the intestines, remains persistent, increases, and at length leads to the deposit of a hard, amorphous exudation, which becomes disorganised. We regard this diphtherous inflammation, not as a new process, arising in the advanced stage of the disease; but as a further development of the intestinal hyperæmia, which commences in the algide stage. Even at that time, we sometimes find larger or smaller portions of the deeply-injected mucous membrane infiltrated with an amorphous exudation, and, moreover, those portions of the bowel, where the diphtheritis occurs, are those, in which the greatest amount of conges-

tion is found, in those dying during the cold stage; we further observe, that this diphtherous inflammation generally takes place during the typhoid stage, but not constantly so, since it was sometimes absent in those affected with the fever, and sometimes present, when there was no typhus, when the patient died of pneumonia, or other fortuitous complication.

The *External Serous Surface of the Intestines* and the *Peritoneum* generally was covered with a considerable quantity of sticky fluid, which foamed with friction like soap.

The *Glands of the Mesentery* were more or less swollen, and sometimes of a reddish grey hue, and congested; but generally white, or slightly yellow. The discoloration almost always commenced at the surface, and extended towards the centre of the gland. Under the microscope were seen, besides the usual unchanged parenchyma and lymph globules, a number of small molecules.

The *Stomach* was often found, during the algide stage, congested in spots of more or less size, which were often also affected with extravasation. This was chiefly situated at the fundus; but occurred also at the pylorus, extending over the whole organ. Its glands were sometimes normal, sometimes swollen.

The lining membrane was nearly always covered by tough mucus, generally white; but sometimes stained by extravasated blood of a reddish-brown, or nearly black tinge, forming the white or brown mucous shreds, which are often mixed with the vomit. Sometimes, though very seldom, in this part of the disease, bile is found in the stomach, and, even when the vomiting has been very frequent, some remains of food. In the after-stages, the congestion was much less intense, or altogether absent. We have never found depositions of a firm substance in this organ, but not unfrequently such scars as are left after catarrhal inflammation.

The *Œsophagus and Pharynx*.—The mucous membrane of this tube was generally, in the first stage of the disease, congested, the lower part of the *œsophagus* being chiefly thus affected. The epithelium was not unfrequently separated from the longitudinal folds, laying bare the membrane itself, infiltrated in some spots with extravasated blood.

In the further course of the malady we thrice detected some diphtherous deposit. In one case this was in small spots on the surface of the membrane, which was bare of epithelium. In a second, the mucous lining of all the lower half of the *œsophagus* was more or less deeply

infiltrated, and, the substance being partially disorganised, had left numerous small ulcerations, giving all the affected part of the œsophagus a sieve-like or reticulated appearance. At the same time we found a diphtherous ulcer at the junction of the pharynx and trachea, over the upper part of the arytænoid cartilage; a smaller ulcer was situated on the lateral part of the pharynx.

In a third case, the mucous membrane and submucous tissue in the lower part of the œsophagus were full of this deposit, while the infiltrated structures were in a great measure so disorganised, that the muscular tissue was exposed throughout a considerable portion of the tube. In the last two instances, the patient had suffered from difficulty in swallowing, and had frequently vomited mucus mixed with blood. These appearances would probably have been observed more frequently, had the œsophagus, in every instance, been examined; but as, in the earlier researches, we had always found the tube healthy, the examinations thereof were neglected, until certain symptoms during life caused us again to dissect this tube.

The *Liver* was, particularly in the first stage of the disease, devoid of blood; even on cutting into the larger vessels of this organ but little

blood flowed. Its consistence was normal, its colour generally pale yellow or brownish, and a so-called red-substance was usually but imperfectly or not at all recognisable.

The *Gall-bladder* in those dying in the algide stage was, with very few exceptions, extremely full and distended with bile, so much so, that it often projected to the breadth of one or two fingers beyond the edge of the liver; its contents could easily be pressed into the intestine. The bile was generally thin, fluid, and brown; but in certain cases, when the algide state had been protracted, it was green. Thus, in this disease, bile, though secreted, is not poured into the intestine, but contained in the gall-bladder. We must seek the cause hereof in irritation and catarrhal affection of the common duct, which, perhaps, combined with muscular spasm and with swelling of the membrane, prevents the flow of the biliary secretion. This inflammation might easily arise by continuous sympathy with the congested duodenum, and is not an exceptional circumstance, since inflammatory affections of that bowel are very commonly propagated along the membrane of the gall-ducts.

In the further course of cholera the gall-bladder, often less strong than usual, was

filled with scarcely altered bile. In many cases it was still more distended, protruding to the breadth of three fingers beyond the margin of the liver. Its contents were then various, sometimes being thinly fluid, green and mixed with numerous white shreds; sometimes a white or yellowish fluid, free from bile, but containing a large proportion of mucus and of small shreds; when allowed to rest, this liquid separated into a transparent, serous, fluid portion, containing albumen, and into a pus-like deposit, sometimes thick and consistent, sometimes full of fine shreds and flocculent. Under the microscope this deposit was seen to consist of epithelium from the gall-bladder, amorphous mucus, and of round cells, containing one or more nuclei (mucous and pus globules), the latter in the greater proportion the less stringy was the sediment. The gall-bladder was, in those cases, in which its contents were colourless, considerably distended, its mucous lining violently congested, and more or less completely deprived of epithelium. In some few such cases the ducts contained mucus, mixed with a large quantity of desquamated epithelium and mucous corpuscles; the substance of the liver was, moreover, deeply dyed by bilious colouring matter; the fæces were but little

coloured, but the skin showed no signs of jaundice.

Once, in a patient, who died seven days after the first attack, we found certain parts of the mucous membrane violently congested, and infiltrated with diphtherous exudation; the sub-mucous tissue contained extravasations of blood, which could be even externally detected.

The changes, which were observed in the latter stages of the disease, depend generally upon catarrhal, but sometimes also, on diphtherous inflammation of the mucous membrane lining the gall-bladder and ducts. The icterus, which sometimes follows cholera, is probably due to a disturbance in the secretion of bile, since we have found, when this catarrh was present, that the liver had been dyed by that fluid.

The *spleen* showed, in regard to volume, no constant change. Sometimes, chiefly in aged subjects, it was very small, but usually of the normal dimensions; in some few cases it was considerably enlarged, in one it measured ten inches in length, six in breadth, and four in thickness. Its capsule was sometimes, more particularly in children and young people, smooth and distended, but generally it was more or less corrugated. Its substance was com-

monly of the usual colour and consistence. The white (Malpighian) bodies were plainly visible, and in the above case of much enlarged spleen, were of the remarkable size of hemp seeds, of a yellowish-white hue, and easily separable from the rest of the organ, the substance of which was slightly indurated, but otherwise quite normal. A thick fluid, evacuated by puncture from these Malpighian bodies, showed, under the microscope, the usual parenchymatous corpuscles of the spleen (formations like the nuclei of cells). We have not unfrequently found, even in those dying in the cold stage, congested portions of the spleen studded with red or bluish spots of extravasated blood, giving rise to hard knots of very different sizes, some even as large or larger than a hazel-nut. This exudation, under the microscope, was seen to consist of unformed fibrin and blood-globules. In the further stages of the disease we found these *hæmorrhagic infarctions* sometimes in the state above described, sometimes more or less altered, frequently still hard, but discoloured, yellowish-red, or quite yellow. Once we found the discoloured lump very hard, dry, and considerably shrivelled, while the neighbouring surface of the spleen was contracted. These hæmorrhagic infarctions, in fact, pass through

the same changes, as in other diseases; they first lose their colour, and become, in some cases, disorganised, while, in others, the fluids are absorbed, and they harden into little dry knots of fibrine.

Urinary Organs.

The *kidneys* presented often, in the beginning of the malady, an abnormal appearance; they were not in this stage enlarged, though their vessels, and particularly the veins, were slightly congested; but we never observed in this, as later in the disease, an intense capillary hyperæmia. We have often found the kidneys in certain places discoloured, of a white or yellowish hue, in consequence, as shall be explained, of infiltration into the substance of the kidneys, of a peculiar deposit. This change begins at the papillæ, and extends thence towards the bases of the pyramids. The papillæ and the affected part of the pyramids were then hard and of a white hue; but before the exudation has greatly extended, certain changes also take place in the cortical substance, which then becomes grey or yellowish-white; the alteration commences sometimes at the surface, but generally at the part next the

pyramids, so that the still normal portion of the tubular substance is surrounded by a margin of discoloured cortex. The deposition of this exudation does not, therefore, take place continuously in the contrary direction of the urinary passages, from the papillæ to the surface; but begins, nearly at the same time, in the pyramids and in the cortical substance. The still untouched parenchyma of the organ is sometimes of the natural colour, sometimes of a lighter hue. In the further course of the disease the infiltration continues to encroach on the substance of the kidney, but chiefly in the cortical portion, which swells considerably, loses its colour, and is more readily torn, than in its natural state; the capsule, also, is more easily separable, and the surface of the gland then appears rough and granular. In the tubular portion of the kidneys the exudation continues also to gain ground, proceeding from the mammillary processes towards the bases of the pyramids, and an interspace of normal or nearly normal medullary substance is not unfrequently interposed between the swollen, greyish, cortical portion, and the infiltrated tubular structure. Larger or smaller portions of the infiltrated pyramids were often bright yellow, particularly when the patient had been

long typhoid; a colour which depended upon a plenteous deposition of fat. Kidneys in this condition were usually considerably swollen, although in various degrees; we have seen them measure as much as 5 inches in length, $2\frac{3}{4}$ in breadth, and $1\frac{1}{2}$ in thickness.

These discoloured parts of the kidney, in those dying in the first stage, were examined under the microscope, and the epithelium of the tubes was found much tougher than usual, and could not so easily be torn by pressure as is usually the case. Hence it were easy to show from this more or less striking peculiarity, that the cells contained in the tubuli do not fill them, but simply form a lining membrane, which can be perceived even in those parts of the kidney, which do not appear much altered. When the contents of the tube were pressed out in a bag-like form, an upper and under wall, according to the position of the focus, could be distinguished; these were separated by an intervening space, devoid of cells; sometimes, moreover, a fortuitous rent in the upper membranous expansion enabled us to see into the cavity. The epithelium cells also were in the discoloured portion of the kidney, less clear and transparent than usual, in consequence, sometimes, of an increase in their contents,

consisting of small dark molecules, sometimes of a finely granular deposit, which covered their surface. Even in the algide stage of the malady the cavity of the tubuli was filled with an exudation, for we have found this to be the case even in those dying very rapidly, but more frequently, when that condition had been somewhat protracted. This deposit was often perfectly homogeneous, and devoid of structure, taking the form of the tubes, or it was granular, and enclosed in its substance single epithelium cells and blood-globules; occasionally it assumed the form of pyramidal fragments, stained by extravasated blood.

In the further stages of cholera, these changes are much more extensive, and more plainly visible, when, as in the subsequent typhus, the cortex of the kidney is entirely discoloured. In this advanced state, however, a considerable quantity of fat frequently takes place. Thus in the early stages the substance pressed from the tubuli is granular, and almost entirely soluble in acids and alkalies, while the outline of each cell is plainly visible; but afterwards we find dark globules of fat, insoluble in the above reagents, but soluble in æther; these occur in such quantities, that they greatly conceal our view of the cells; at last, as this process ad-

vances, the swollen tubuli become so opaque, that nothing can be distinguished, except closely-packed oil globules. The spots, so altered by the deposition of fat, are at once recognisable to the naked eye on account of their yellow colour. The fat is situated at first chiefly in the epithelial cells, a fact perceived more easily on the addition of diluted alkalies, for the oil globules then take on molecular motion, inside each cell, and when its membrane breaks, they gush forth with the other contents of the vesicle. Sometimes, when the disease has been of long standing, the cells are so filled with fatty matter, that they and their nuclei are disorganised; a process, which only takes place in small portions of the kidney, and which we recognise, when we see the enlarged tubes filled with irregular conglomerations of fat and scattered drops of oil. Thus the changes, which the kidney undergoes, depend upon a fibrinous deposit partly into its component tissues, and cellular membrane of the organ causing its enlargement, partly into the tubuli whence arise the fibrinous moulds, found during life in the urine. Thus the same conditions occur in this malady, as are collected together under the name of Bright's disease; but it is remarkable, that in the course of cholera, this exudation should

take place without any considerable congestion. As the deposition of fat in the tubular epithelium advances, the cells become granular, a change which is always observed in cellular organs, whenever a process of deposit in them is established; this fatty degeneration begins very early in cholera, often five or seven days after the commencement of the disease.

In several cases we found spots of extravasation in the kidneys, once, when the patient died in the algide stage; in other cases, when death had occurred in the subsequent phases of the malady. These were nearly always situated in the cortical substance, and as in the spleen, were at first firm, and of a reddish-blue or brown hue, then became discoloured, degenerating gradually into a yellow pus-like detritus. So extensive was, in one case, this infarction, that it occupied more than two-thirds of the cortex of the kidney; the patient had suffered, during re-action after the algide stage, from violent pain in the loins and lower abdomen, and from constant desire to pass urine. The hæmorrhage probably takes place, at least in many cases, during the first part of the disease.

The *Ureters* are generally affected with more or less catarrhal inflammation. The renal

pelves, however, were often but slightly congested, and often contained, in various quantities, a yellow puriform fluid, composed of desquamated epithelium, mucus, and pus globules. The condition of these parts is probably the cause of the commencement of infiltration at the papillæ, which process begins at the mucous membrane, and extends into the substance of the gland, which, however, may become independently affected. The ureter also, sometimes, contains the same puriform fluid as the pelvis of the gland.

The *Bladder* was, in the algide stage, almost always contracted and empty, sometimes, particularly at the neck, slightly congested, and covered with a layer, variable in thickness, of desquamated epithelium. This catarrh-like affection was commonly increased in the after-stages of the disease.

Generative Organs.

The *Female Organs of Generation* were, except the intestinal canal and urinary organs, more frequently the seat of morbid change, than any part of the body; the uterus, vagina, and ovaries were always more or less diseased.

The *Uterus* was found, in those dying algide, thus affected:—The cavity of the womb was very frequently filled, either with bloody mucus or with pure coagulated blood, while both the larger and smaller vessels of its mucous membrane were violently congested. Sometimes the whole membrane was in this condition, but generally only certain portions, namely, the fundus and upper part of the corpus uteri, the os, and rather more than half the cervix: between the above-named portions, therefore, was situated some part of the organ in which the mucous membrane was either healthy or less strongly congested. Wherever there was violent congestion, we found spots of extravasation,—sometimes not larger than a pin's head, sometimes of much greater extent; the affected part of the lining membrane appeared often infiltrated with blood. Sometimes we found extravasation without much congestion; although this was situated in those parts of the organ, which are most commonly hyperæmic, the extravasations were chiefly limited to the mucous membrane; but they sometimes encroached on the substance of the organ. In one or two cases we saw them extending through nearly the whole thickness of the uterus, to its serous

covering; they had a wedge-like form, with the base towards the uterine cavity, and sometimes we found hæmorrhagic infarctions into the parenchyma of the uterus, when the mucous membrane was normal, or but slightly congested. When the mucous membrane was violently congested, it was also slightly swollen and thickened; only in few cases have we seen it considerably swelled and irregular, as in the menstrual period, and then the whole organ was full of blood, and a large and ruptured Graafian follicle, filled with blood, was in the ovary, which was not the case in the other instances of congestion and of extravasation into the uterus.

The womb was sometimes in this state subsequently to the algide state, but generally the affection was more fully developed. Its mucous membrane was often throughout hyperæmic, and contained more or less extravasation, but more often it was universally infiltrated with blood. Sometimes its superficial layer was of a dirty yellow colour, as is usually the case with mucous membranes in the commencement of a diphtherous deposit; but we have never found such infiltration to be more extensive, nor to penetrate more deeply. Not unfrequently were seen, in the substance

of the womb, partially discoloured spots of extravasation.*

The *Vagina*.—We often found, in those who died in the first stage of cholera, a more or less extensive congestion of the vaginal mucous membrane, generally combined with extravasation into that structure, and also sometimes into the submucous tissue,—changes which were chiefly situated at the back of the vagina, in the neighbourhood of, and upon the os uteri, and also at the entrance of the vagina, on the labia majora et minora; the central portion of the tube was often unaffected. This congestion increases during the further development of the disease, and a diphtherous deposit is the result. The mucous membrane, and often also the submucous tissue, is then found more or less extensively infiltrated with a greyish-yellow substance, which becomes disorganised and gives rise to ulcers; these are at first bounded and lined by diphtherous matter, but when this wholly separates they assume the character of simple ulcers in the mucous membrane; but it must be observed, that they are seldom seen in so far advanced a condition.

* I have omitted about a page and a half of the German text, in which the authors contend that this hæmorrhage from the genital organs is not menstruation.

Diphtherous inflammation of these parts begins almost always in the neighbourhood of the os uteri, and may subsequently affect the rest of the vagina; in that situation it is moreover generally farther advanced; but in one case this deposit was observed at the introitus vaginæ, while it was absent in the neighbourhood of the uterus. When this deposit was found, leucorrhœa had usually occurred during life.

The *Ovaries* were generally much congested, excluding those cases, in which the state accompanying menstruation happened to be present. Very often there was extravasation in the stroma as well as in the Graafian follicles, which, in some cases, were filled with blood, from those just visible to the naked eye, to the most fully developed. In the latter stages of the disease these extravasations were discoloured. No other abnormal appearances were found in these organs.

We will, in conclusion, remark, that in pregnant women dying soon after abortion, we found diphtherous ulcers in the vagina and on the os uteri; the placenta had not separated; we observed other abnormal appearances, either in the walls of the uterus, or in the placenta.

No pathological conditions, connected with cholera, have been found in the male organs.

Respiratory Organs.

The *Lungs*.—When the patient died algide, the lungs were usually found collapsed; extravasations and ecchymoses were often seen, both on the pleura pulmonalis et costalis. The tissue of the lung itself was usually dry and bloodless, more particularly in the upper lobes, the larger venous branches only, when cut, yielded any blood. The lower lobes contained, generally, more of this fluid. Sometimes we found, in elderly persons, the lungs well inflated, and once, like Virchow, a fine interlobular emphysema. We have occasionally seen œdema of the lung, chiefly, however, in the lower lobes, and when the algide stage had been protracted. Once in this condition were found, in the substance of the organ, innumerable little dark-blue spots of extravasation.

In later stages of the disease this appearance was oftener observed; the spots, however, were much larger, and in various periods of development, from simple soft dark infiltration of the pulmonary tissue, to hard discoloured knots, which afterwards would become disorganised, destroy the surrounding tissue, and form little vomicæ filled with a puriform detritus. The

lobular pneumonia, which we often met with, always commenced in the lower lobes. The exudation was generally hard, as in ordinary pneumonia; but in two cases we found it a gelatinous fluid, very like that which accompanies tubercular infiltration; in a few spots this had coagulated to a firm white mass, which was, under the microscope, amorphous,—another point of similarity to the tubercular exudation. The lungs, in these cases, were studded with numerous yellow spots, which, on closer examination, proved to be small bronchi, filled to their last ramifications with pus, which also occupied the larger, violently congested, bronchial tubes.

The lining membrane of the bronchi was often found congested, particularly in certain parts, namely, the lower and posterior portions; in such cases, there was often small lobular pneumonia. We once saw a small spot of the mucous membrane of a large bronchial tube, near the division of the trachea, covered with diphtherous deposit.

Circulating System.

The *Heart*, in the first stage, had the following appearances. The pericardium con-

tained but a small quantity of fluid; it was often studded with small ecchymoses, chiefly situated on the posterior surface of the heart, particularly at the left ventricle and at the inner surface. The right ventricle and auricle were filled, to distension, with blood; the left ventricle and auricle contained comparatively little. The blood in the heart was nearly always coagulated, generally to a dark, lumpy mass; and there were always the polypus-like coagulations in the cavities and the large neighbouring vessels. We can confirm Virchow's statement, that these concrete masses contain a large quantity of colourless corpuscles. With regard to the *blood-vessels*, we can only say, that the large venous trunks, as also the veins of the several organs, were always overcharged with blood; this fluid, in fact, was distending the venous system, while it left the arteries and capillaries more or less empty. Even in those dying in a subsequent stage, this surcharged state of the veins was found more strongly marked, the sooner the patient died after the commencement of reaction.

The lymphatic glands, in different parts of the body, were not unfrequently discoloured, like those of the mesentery; but were, nevertheless, not much enlarged. In other cases, however,

they only seemed somewhat paler, than in the natural state.

Nervous System.

In those dying in collapse we always found the veins of the cerebral membranes more or less congested, and frequently accompanied by some œdema of the pia mater. The substance of the brain itself did not appear to be in any way abnormal; sometimes a little hyperæmic. In the ventricles nothing but congested choroid plexus. Neither in the typhoid state have we observed any particular affection of the brain, except venous congestion, which was not so considerable as in the algide stage. There was not unfrequently œdema of the pia mater; sometimes rather more serum than usual in the ventricles. In a few cases the substance of the brain was slightly œdematous. We observed these changes, also, in those who had suffered from no cerebral symptoms, and who died, after reaction, from some fortuitous complication. We made no examination of the spinal cord.*

* From a paper in Virchow's 'Archiv.'

CHAPTER IX.

RETROSPECT.

THE precedent and contemporary history of cholera, in every outbreak, at every town, shows it to be closely connected with diarrhœa; but whether this is the same form of malady, that usually prevails in the autumn, under the name of English cholera, cannot be absolutely determined. In each individual, an attack of purging precedes cholera, whence we may conclude, that, as long as but a small quantity of the poison has been absorbed, this mild disturbance only is produced, which passes into the deadlier form, when the whole force of a full dose begins to act. In each town an outbreak of diarrhœa precedes the attack of cholera, probably because the lethiferous influence does not commence abruptly, but by degrees; beginning gently, and gaining gradually in power; but it soon increases in intensity, acts in full doses, and then the cholera epidemic commences.

That Cholera Asiatica is, in some way, con-

nected with typhus fever, is proved by its history, and by its favorite habitats being the same as those of the former disease, at least, in this country ; while, in others, where remittent fevers take the place of typhus, they assume analogous relations with cholera, as is the case in Hamburg and Berlin. Also by the occurrence of certain isolated cases, the symptoms of which fluctuate between those of cholera and those of typhus fever.

But a further analogy may be perceived between typhus and cholera, in the fact, that a fever of that type succeeds in individuals in the algide stage of the disease, that, in certain cases, the symptoms of cholera and continued fever fluctuate, giving the disease now one, and now another aspect. This succession of symptoms is, indeed, so rythmical, that we have been led to conclude, that cholera is in reality an intermittent form of typhus fever, as before observed. There is in the *post-mortem* appearances of the intestines, and in the occasional eruptions of each disease, a curious analogy between those dying late in the cholera attack, and those dying in typhus, a resemblance which we cannot now follow out ; but to which we wish to direct attention, as bearing out this view.

The influence, whatever it be, which pro-

duces typhus or remittent fever, epidemic diarrhœa, or cholera, has a tendency to confer on all maladies a low asthenic type, since, at the period and in the places, where these diseases most abound, there scarlatina, measles, or smallpox, are apt to assume the malignant or confluent form; moreover, during the last twenty years, while fevers have become more localised in London, all diseases have, more or less, lost their former sthenic character.

The attack of cholera, omitting the premonitory or incubative period, consists of three portions, the algide, reactive, and febrile stage, which series of events approaches more nearly to the intermittent type of disease, than to any other known form of malady.

The cold, or algide stage, is characterised by coldness of surface, loss of pulse, rice-water purging, cramps, &c. ; all of which symptoms may be caused by the congestion of all internal veins of the body, and the withdrawal of blood from the arterial system, more particularly from its external branches. It seems as though the blood, in passing once through the systemic capillaries, had become thicker, or had undergone some other change, which rendered it unfit again to enter capillary circulation; it is, therefore, retained in the large veins, and

being unable to pass through the lung, remains clogging the right heart and pulmonary arteries, whence the obstruction extends into other veins, giving rise to the oppression of the brain and blueness of the skin, and, in fact, to the general venous congestion. The portal vessels, and those supplying them, viz., the mesenteric and splenic veins, are, however, most liable to be thus affected, for the blood of other organs find a species of receptaculum in the large *venæ cavæ*; but that from the intestines (being unable, as in other parts, to circulate in capillary vessels,) cannot pass through the liver, and is, therefore, pent up among the organs, almost as though the vein were ligatured. Therefore we have during life, rice-water stools, or purging of blood, and we find, after death, intense congestion, which reaches even to the capillaries, diphtherous inflammation, deposits, &c. &c., changes which, though from the above cause are most frequent in the intestines, are not confined to that tube, since the kidneys, the uterus, and even the lungs, are sometimes found to be affected with diphtheritis. Rice-water and bloody purging can of course only take place from the intestines, but serum is effused in other parts; the brain and lungs even being sometimes œdematous, while

most organs in the body are found liable to effusions and extravasations of blood.

Thus it appears, that the immediate cause of all the symptoms is the great internal congestion, and that our treatment should be primarily directed to overcome this condition; to do which, the first object is to recall the blood to the surface, when it seems to lose the quality, which prevented its due distribution to the various organs. To effect so beneficial a change, it appears that external heat, combined with internal cold, are the most useful remedies; while, in most cases, the mineral acids, in certain proportions, aid in dispersing the congestions about the intestinal canal. When we consider the morbid anatomy and pathological conditions of this disease, and thence endeavour to draw conclusions as to the probably best therapeutic agent, we shall certainly find, that no such rational plan of treatment as the above has yet been proposed,—none in which the remedies were so well directed to the relief of the encumbered actions. Moreover, experience has proved its powerful and its good results. The injection of veins, calomel, opium, turpentine, tobacco, salt, &c., are not directed to the one root of the various symptoms, by the eradication of which alone,

we can hope to cure. We have no direct antidote to the poison, whatever it be, which produces cholera, and we cannot by any medicine at once restore healthy qualities to the blood, and obliterate the evil already effected by the venom; but by restoring warmth, and producing circulation at the surface, the large vessels may be unloaded, and the heart may acquire liberty to act, and the morbid processes of the interior may be arrested.

Consecutive fever, which now follows, is the reverse of the previous state. Formerly the system was overwhelmed and oppressed: the right heart, overburdened, could not cast off its load, and was beginning to yield the ineffectual struggle, while the left was almost devoid, not of the power of acting, but of that on which it was to act. Now some alleviation has been tendered, the heart and the whole circulating system violently strive to remove the oppressive load, the heart beats with force, the pulse is hard and throbbing, the face flushed, and the surface hot; then, if the disease is still in a state amenable to cure, these symptoms disappear more or less rapidly as the impediments yield, and health is in time restored. Thus, if in such stage of the disease some fortuitous complication should destroy the patient, we

find the congestions, and other morbid appearances gradually fading and approaching obliteration.

Sometimes, however, the termination is not so fortunate; the gripe of the disease has been too firm, and, in spite of all efforts, which the system makes, the congestions will not be overcome. The heart, acting with force, drives the blood into the capillaries, which cannot empty themselves into the veins, and still further mischief results, particularly in the intestines, where, for reasons already explained, the congestion is more violent and less easily overcome than elsewhere. The morbid processes pass to a more developed stage; the weakened patient droops and sinks, not into the collapse of a system suddenly overcome by the violence of an attack or injury, but into the low, oppressed condition of one whose power of life is yielding to a slower disease. The pulse loses power, but remains rapid; the skin is hot and dry, the tongue brown or black, and typhus is fairly developed.

In the body, after death, we trace vestiges, which may tell us what the actions during life effected; the congestions now reach to the capillaries, for the blood forced into them could go no farther; the diphtherous deposit has

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partially sloughed, leaving ragged ulcers in its stead ; in many places, the vessels, obstructed in front and distended by a force behind, have burst, and blood has been extravasated ; and in other parts effusions of serum and œdema have been caused.

Thus, in every stage of cholera, we find, that congestions and their results are the immediate cause of evil. In every organ, every texture, affected in the disease, do we find either this appearance itself or its effects ; and, whatever may be its ultimate cause, it is this which we must combat. The whole course of events is an exaggeration of that which takes place in an ague fit. The external cold and internal congestion, in the cold stage of that malady, are comparatively slight and of less continuance, and, when the blood again returns to the surface, the inequality of the circulation leaves no injury behind ; but the rice-water purging, the vomiting, which do not occur in ague, are the consequences of the very highly-congested condition of the intestinal canal. It is not intended to express that these diseases are identical, but that they are, to a certain extent, analogous ; for though doubtless many circumstances occur in cholera, which are not simply attributable to the great

disturbance in the circulating system, yet are many symptoms caused by this want of balance; and where this can be perfectly and tolerably quickly relieved, then do the patients recover.

From these reflections, perhaps some conclusion may be drawn as to the curious fact, that astringents administered during the premonitory stage often ward off the attack of cholera. May not, for instance, choleraic diarrhœa depend upon incipient congestion, so slight, that such remedies are able to subdue it, while, if allowed to continue and increase, it may, at length, become too inveterate to be amenable to such treatment, giving rise to the symptoms of fully-developed Asiatic cholera?

The disease is not of a genus entirely different to, but is a tropical modification of, one which is common with us. It can only attack, in that form, when the poison has reached a high pitch of intensity, by the admixture of local with epidemic causes; placing the community much in the condition of one in the tropics, both by the slow enervating action of the poison accumulating upon their constitution, and then, when at full tension, by its virulent attack, approaching more nearly to the deadly seizure in such climates, than to the more moderate mode in our temperate zone.

The tropical epidemic poison itself is, in this country, comparatively harmless, unless it meet with, and is strengthened by local malaria of considerable power, which are in a great degree under our control, and then regains all its vigour. As in certain German mystic tales, the hero is unassailable by the fiend, until some sin of the man have given power to the demon.

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